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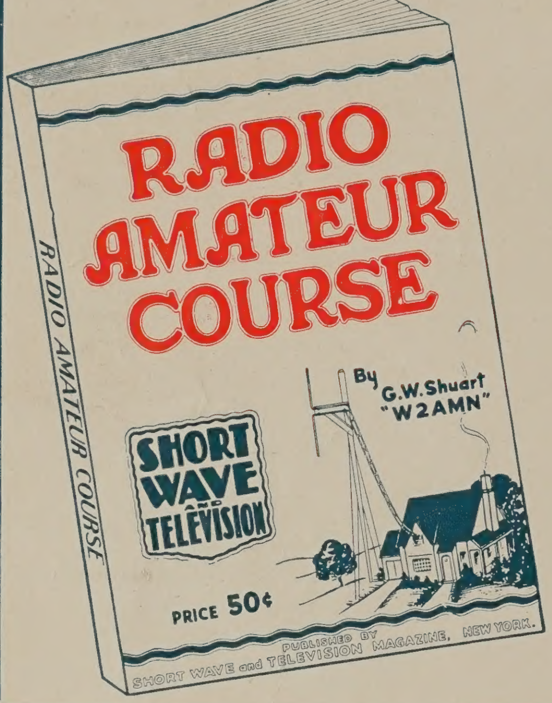
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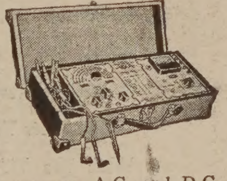

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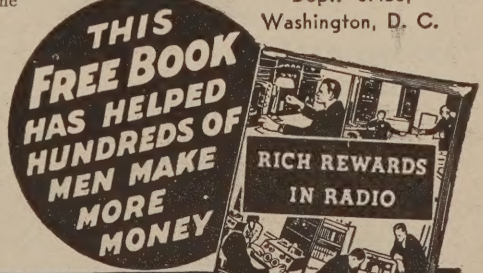
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The Popular Radio Magazine

DECEMBER—1938

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Published by Popular Book Corporation. Publication Office—29 Worthington St., Springfield, Mass. **Editorial and Executive Offices**—99 Hudson St., New York, N.Y. HUGO GERNSBACK, President; H. W. SECOR, Vice-President; EMIL GROSSMAN, Director of Advertising. **European Agents:** Atlas Publishing and Distributing Co., Ltd., 18 Bride Lane, Fleet St., London, England; Brentano's—London and Paris. **Australian Agents:** McGill's Agency, 179 Elizabeth St., Melbourne.

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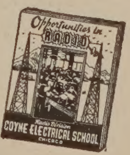

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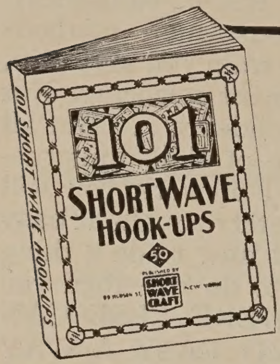

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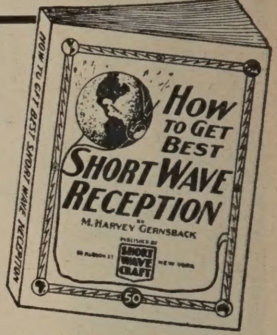

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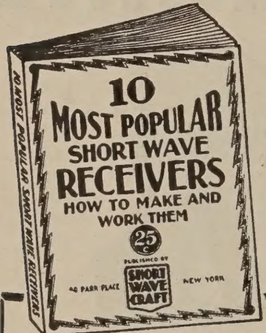

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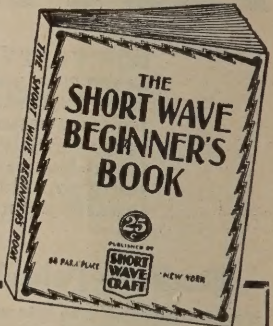

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Try-Mo Radio Co., New York City
Van Riemsdyck Book Stores, New York City
Wholesale Radio Service Co., Inc., New York City
H. W. Wilson Co., New York City
Radio Parts & Equipment Co., Rochester
M. Schwartz & Son, Schenectady

OHIO
College Book Exchange, Toledo

OREGON
J. K. Gill Co., Portland

PENNSYLVANIA
Radio Electric Service Co., Philadelphia
Cameradio Co., Pittsburgh

WASHINGTON
Seattle Radio Supply Co., Seattle
Wedel Co., Inc., Seattle
Spokane Radio Co., Spokane

WISCONSIN
Radio Parts Co., Milwaukee

ARGENTINA
Radio Revista, Buenos Aires

AUSTRALIA
McGill's Authorized Agency, Melbourne

BELGIUM
Emil Arens, Brussels

CANADA
T. Eaton & Co., Winnipeg, Man.
Electrical Supplies, Ltd., Winnipeg, Man.
Wholesale Radio Supply, Winnipeg, Man.
Canadian Electrical Supply Co., Ltd., Toronto, Ont.
Radio Trade Supply Co., Ltd., Toronto, Ont.
Canadian Electrical Supply Co., Ltd., Montreal, P. Q.

BRAZIL
Agencia Soave, Sao Paulo

CHINA
China News Co., Shanghai
International Booksellers, Ltd., Shanghai

CUBA
Diamond News Co., Havana

ENGLAND
Gorringe's Amer. News Agency, London

FRANCE
Toute La Radio, Paris

GERMANY
Rehr G.M.B.H. SW15, Berlin NW No. 7

HOLLAND
Radio Peeters, Amsterdam, Z,

INDIA
Empire Book Mart, Bombay

MEXICO
American Book Store, Mexico, D. F.
Central De Publicaciones, S. A., Mexico, D. F.
Jaques Salvo, Mexico, D. F.

NEW ZEALAND
Johns, Ltd., Auckland
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RADIO & TELEVISION

HUGO GERNSBACK, EDITOR

H. WINFIELD SECOR, MANAGING EDITOR

Ultra Short Waves and Television

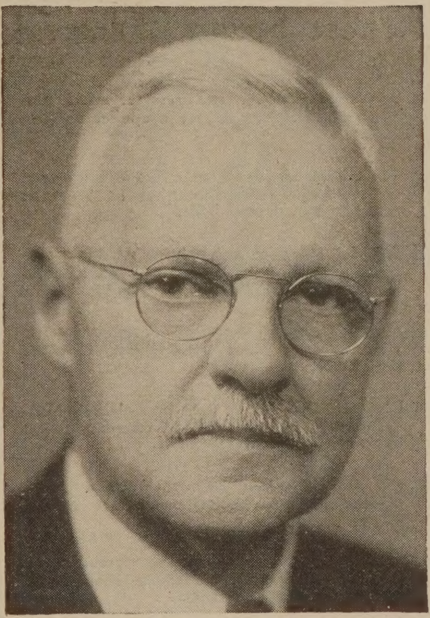
Dr. Greenleaf Whittier Pickard

● AS this editorial is written, the European situation is still uppermost in our minds, and frequently-asked questions are: What part will radio play in the next war, aside from its normal use in military communication? Will radio methods be developed for the location of enemy submarines? How will a nation at war, or preparing for war, best keep in touch with its citizens? It may interest your readers to discuss these and allied questions from a broadcast engineer's viewpoint.

During the past quarter century many tests have been made of radio communication to and from submarines, and the results of these tests have been in full agreement with the simple theory of electro-magnetic screening by a conductor. Salt water is a rather good conductor, so good in fact that only low frequency waves can penetrate it to any appreciable depth, so it would seem that radio methods of locating submerged submarines would be of little value. In the next war, as in the World War, we must lean heavily on acoustical rather than radio methods of detecting and locating under-water craft.

The problem of radio broadcasting to a nation in war time is essentially similar to that of peace-time broadcasting, save that the audience must be protected from malicious interference from enemy stations, and, if possible, induced to ignore broadcasts of enemy propaganda. An ideal solution of this problem (as well as those of peace-time broadcasting) has already been made by Major E. H. Armstrong, and consists of an ultra-high frequency carrier of *frequency modulation.* Such a system is immune to enemy interference from any considerable distance, by reason of the propagation characteristics of ultra high frequencies, which are not turned back to earth by the ionosphere, and hence die out rapidly beyond the horizon. Such a service would also be relatively free from enemy propaganda, for as soon as a nation built up a large listening audience on such a system, few would care to stray out of the band into regions of enemy broadcasts at lower frequencies.

When, as, and if we have another major European war, it would seem that the principal part played by radio would again be pure communication, with the dots and dashes of the Morse code predominant. Of course, there would be an increasing use of *teletype* and *facsimile,* and quite possibly some use of *television.* And again, particularly if this country should be involved, the *radio amateur* would play an important role, as he has in many past emergencies. It takes much longer to make a technically competent code operator than it does to transform a civilian into a soldier, so the nearly fifty thousand amateurs of the United States are an important asset in time of war. It is not by accident that three-quarters of the world's amateurs are concentrated in this country; it is because we alone, of the world's nations, have consistently encouraged amateur radio.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Dr. Greenleaf Whittier Pickard—one of the foremost radio engineers in this country. Dr. Pickard has been very active in radio research for many years and has contributed numerous valuable inventions to the radio art. Our readers will find the views of Dr. Pickard on the present-day aspects of ultra-short waves and television of unusual interest.

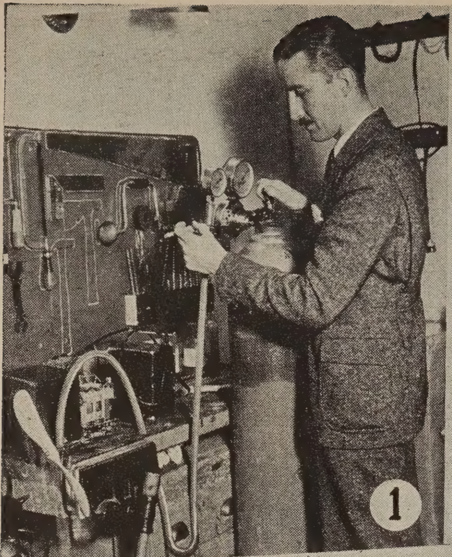
Having already mentioned, as an advantage of ultra high frequency broadcasting, the fact that such waves are strictly limited in range, one is led to a further discussion of this advantage. As is well-known, the lower frequency waves used in normal broadcasting are nightly turned back to earth at considerable distances from the transmitter. This "turned back", or *sky-wave* has its disadvantages in broadcasting, as a brief analysis will show. There are at present three general classes of broadcasting stations in this country, namely, *clear channel, regional* and *local.* While the clear channel stations make some use of the sky-wave in serving large areas of rural population with an inferior or secondary coverage, sky waves are a positive and serious disadvantage to regional and local stations, by reason of the interference at night between such stations on the same frequency channel. If it were not for the sky wave, many more and better located regional and local stations would be installed, and the listening public would obtain a greatly improved service.

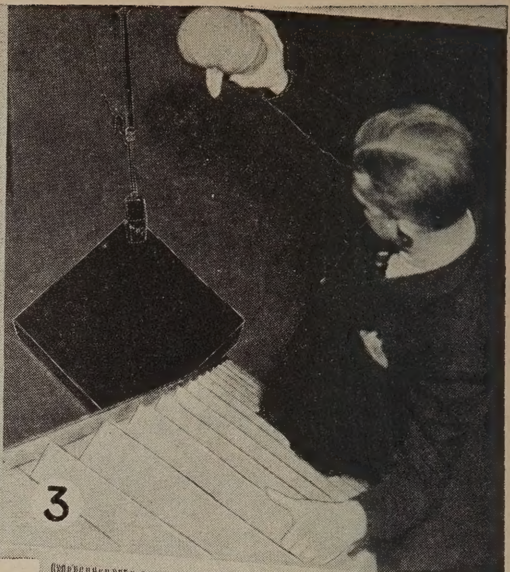
When broadcasting is done at *ultra high* frequencies there is, practically speaking, no sky wave and hence no co-channel interference between stations located some two hundred miles apart, so that on a single frequency, well over a hundred stations could be sprinkled over the United States. With a very limited number of frequency channels assigned to such service, say ten channels, between one and two thousand stations could be allocated in this country. And if, in addition to the use of ultra high frequencies, Armstrong's system of *frequency modulation* were used, a still larger number of stations could operate on these same ten channels, for the reason that interference is greatly decreased by the use of frequency modulation.

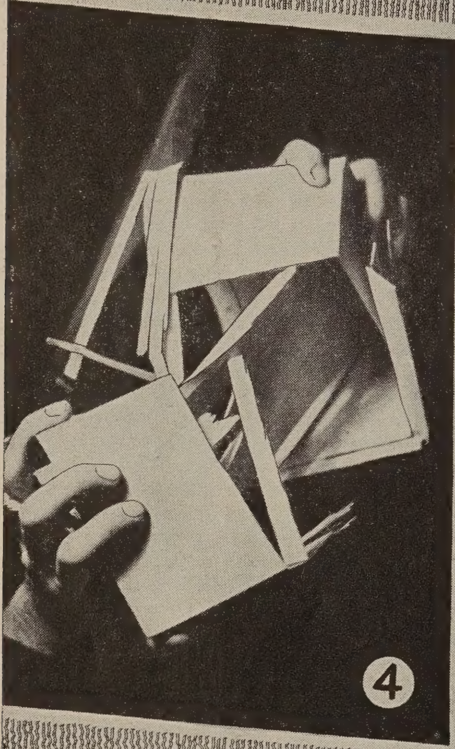
Any consideration of ultra high frequency transmission leads inevitably to the subject of *television,* for television, with its broad six-megacycle bands, is necessarily placed

(Continued on page 491)

Twenty-second of a Series of "Guest" Editorials.







Can You Recognize These Sound Effects?

1 Airplane propeller and rush of wind past fuselage simulated by toy propeller and air tank.

2 The crackle and roar of a fire are imitated by the sound effects man as he crumples cellophane near the mike.

3 Suicide! Sound of man's body striking pavement is achieved by dropping a small pumpkin onto a hard board.

4 An auto wreck or a door battered in—it's all done by crushing a berry box, to make the "breaking" sound.

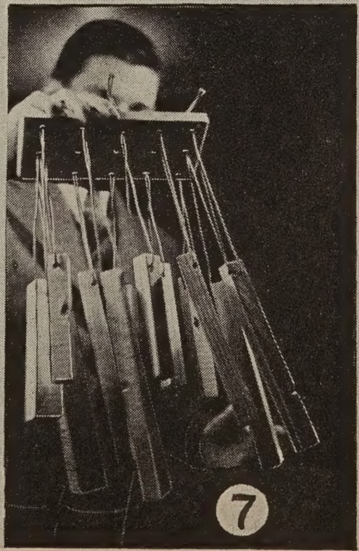
5 Cloppety-clop, the cavalry comes. Two "plumber's friends" beaten together sound like horses' hammering hoofs.

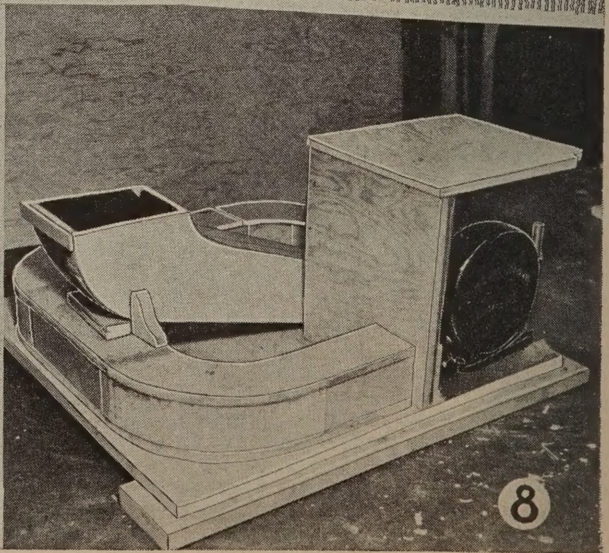
6 An army marches on, when these sticks pivoted in their wooden frame are caused to tap on a table top.

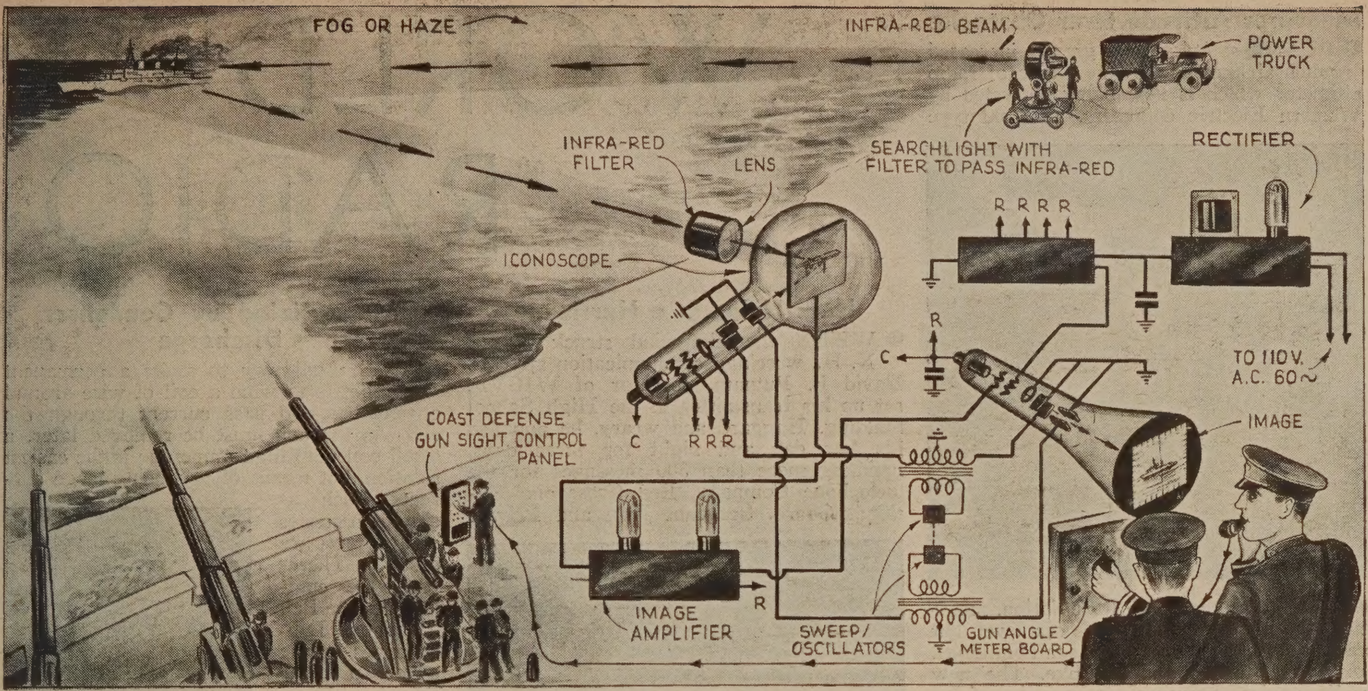
7 Skeletons rattle their bones through the haunted house when the sound effects man shakes this bunch of sticks.

8 Anything from a zephyr to a hurricane may come out of the square horn of this motor-driven wind machine.

—Photos Courtesy NBC.







To penetrate haze or fog, television devices are used in the manner shown. The object hidden by fog or haze is illuminated by an invisible infra-red searchlight beam, and the reflected light rays are detected by an iconoscope.

2 New Inventions

TELEVISION EYE
Pierces Fog

● AS the picture above shows, it is now possible to see an enemy warship or a ship in distress, even though hidden by fog or haze, thanks to Herbert E. Jones who recently was awarded a patent on this scheme. The inventor combines the use of an infra-red beam of light, which is invisible to the ordinary eye, together with a television tube such as the iconoscope, built so as to be especially sensitive to infra-red rays. If the object happens to emit infra-red rays, it is then simple of course for the iconoscope tube, fitted with infra-red filter and lens, to locate it at once. If the object, such as an enemy warship, does not emit infra-red rays, then it would have to be located by illumination with an infra-red beam, as our artist has here shown.

Mr. Jones' patent shows a diagram for the sweep oscillators, video amplifier, etc. The same oscillators or a.c. generators which cause the cathode ray beam to scan the target plate in the iconoscope tube, also react on the cathode ray beam in the oscillograph tube, so that both target and receiver screen are scanned synchronously.

IMAGE OF ACTOR
Superimposed On Any Scene

Method for Super-Imposing Images

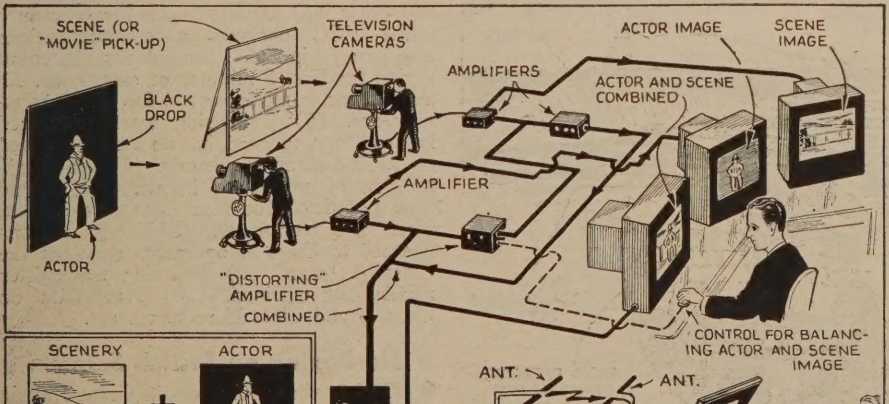
John C. Batchelor recently obtained a patent on a very ingenious scheme for super-imposing two or more television images at the transmitting stations.

An actor could be made to appear in a country scene, in an airplane, or walking along a street in a city; all without the actor having to leave the studio. Not only is this idea suitable for electrically super-imposing one scene upon another, such as the image of an actor upon a scene picked up by a second television camera from a painted stage setting, but scenes from a motion picture film may also be picked up and super-imposed against the image of the actor.

By means of a distorting amplifier, the inventor has made it possible to stagger picture impulses so that the part of a scene which will be simultaneously occupied by the image of a performer's body, for example, will be obliterated—or, in other words, the resulting effect will be that the final picture elements comprise the combination of the scenery and performer signals, and the portion of the scene which should appear immediately behind the performer (ordinarily speaking), does not appear in the final image.

The performer ordinarily appears before a black background, and in this way it is much easier for the control engineer to blend the image of the scene with that of the performer, as the background all around him is composed of one even tone.

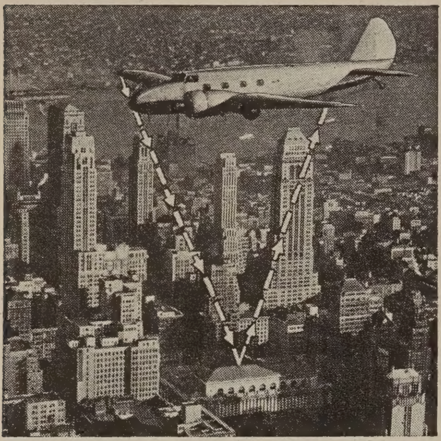
By means of this new television system, two or more scenes may be super-imposed on one another.



WORLD RADIO

Measures Altitude Over Obstacles

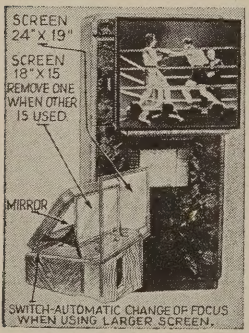
● PLANE safety will be greatly increased when airlines adopt a new type of radio altimeter which is now being perfected by Western Electric engineers. The old type of altimeter, now in use for aviation, measures the plane's height above sea level, but cannot detect such obstacles as tall buildings, mountain ranges, and the like. The new radio device, however, makes use of an ultra-short wave transmitter located on one wing, sending a signal groundward. The reflected signal, turned back by whatever obstacle is below the plane, is picked up by a receiving antenna on the other wing, and is caused to actuate a needle on a "Terrain Clearance Indicator" meter.



France Sets Television Standards

● THE French Radio Minister has announced that television transmission standards are now set until at least July 1, 1941. Wavelengths will be 46 megacycles, with the associated sound on 42 megacycles. Fifty images per second will be sent, with a definition of 440 to 445 lines. The picture proportion will be 5 wide to 4 high, and the frame synchronizing will be about 7%. These transmissions are to take place from the Eiffel Tower.

Large Screen Home Television


SCREEN 24"x19"
SCREEN 18"X15 REMOVE ONE WHEN OTHER IS USED
MIRROR
SWITCH-AUTOMATIC CHANGE OF FOCUS WHEN USING LARGER SCREEN.

● A HOME television receiver capable of producing pictures up to 19 x 24 inches was one of the features at a recent London show. When the lid of the receiver is lifted, a 15 x 18 inch screen rises automatically in the set. If this screen is removed, another of larger size may be placed on the front of the receiver. Pressing a button changes the focus of the television tube so that the image is sharp on either size screen.

Army Perfecting Airplane Detector

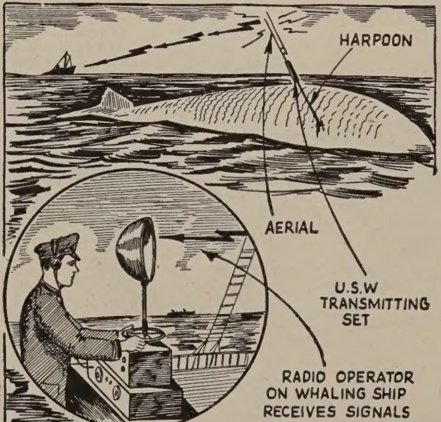
● MUCH secrecy surrounds the new light beam detector which the U. S. Army is perfecting to locate enemy planes before they get within effective bombing range of American cities. The new system is not a sound wave detector, as were the ones formerly used, and it is understood that no amount of muffling or silencing applied to the plane's motors or propellers can foil the new aerial detector.

Ham Helps in a Hurricane

● WHEN the big wind struck Keene, N. H., wrecking communication systems, David F. Putnam, operator of W1GVF, set up his transmitter in the High School building. Haggard and weary, he pounded his key day and night for three days, handling more than 300 messages for the Telephone Company, Red Cross and National Guard. Sergeant Judd and Private Waters, of the Guard, pitched in and helped to keep the station on the air. Other amateurs who cooperated were W1FOF, Springfield; W1AR, Boston; W1APK, Pembroke, N. H. and W1SZ, Hartford. The transmitter worked on 180 meters with an output of 60 watts, using 46 type tubes, and was operated from a portable public address system during the power shut-off. A National 101-X was used for receiving.—Photo from A. E. Freeman.

Whale Wired for Sound

● MODERN ultra short-wave transmitters have solved one of the most serious problems that has affected the art of whaling since its inception hundreds of years ago. One problem that the whalers had was to track down a mammoth mammal which, when wounded by the harpoon, often vanished beyond the horizon. The new harpoon has a built-in ultra short-wave transmitter, while the whaling vessel is equipped with a receiver. The whale may vanish into the fog, but the ship can locate it instantly merely by listening to the signal sent out by the radio harpoon.


HARPOON
AERIAL
U.S.W TRANSMITTING SET
RADIO OPERATOR ON WHALING SHIP RECEIVES SIGNALS

Magnetizing by Condenser Discharge

● THE usual way to make a permanent magnet is to wind a coil of wire around a steel bar and pass current through the coil. As the coil must be removed later, a small coil with high amperage is the easiest solution, but means of producing large currents, such as storage batteries or dynamos, are costly. Therefore, the engineers of the Bell Telephone Laboratories hit upon a new scheme. They connect forty 8 mf. condensers in parallel, charge the condensers from a 350-volt rectifier tube and discharge the condensers through the magnet. When the impedance of the magnet was found to produce an A.C. effect on the discharge, they simply inserted mercury vapor rectifier in series with it.

New Laws for Hams Begin Dec. 1

● EFFECTIVE December 1, 1938, a complete new set of FCC Regulations will govern amateur radio activities. For complete information, readers are advised to request a copy of the regulations (which run to 22 pages) from the Federal Communications Commission, Washington, D. C.

Some of the more important changes are:—(1) 112-118 and 224-230 mc. bands now assigned to ham use. (2) Modulated oscillators and raw a.c. banned on 5 meters and up, but still permitted below 60 mc. (3) Hams must provide (but need not own) means to assure operation of transmitter within bands; monitors or frequency meters will be needed unless working the middle of the band. (4) Power must be measured accurately if station is using over 900 watts. (5) Detailed rules for procedure when FCC declares a communications emergency include compulsory listening period for first 5 minutes of each hour. 1.7 and 3.5 mc. bands reserved for relief transmissions. (6) Television work permitted from 112 mc. upward, but no longer allowed on 1.715 and 56 mc. bands. (7) No transmission of music on ham phone; single tone permitted for test. Carrier to be cut when not modulated. (8) Only stations licensed to Class A operators may use the Class A bands. (9) Portable transmitter regulations clarified. (10) New data on Class B and Class C requirements.

No Boxing on British Screens

● THE boxing promoters in Great Britain have clamped down on television, even when such a modern marvel as Jack Doyle, the Horizontal Harp, is in the ring. BBC offered Promoter Sidney Hulls a substantial sum for the television rights to a Doyle fight. Mr. Hulls turned it down on the grounds that if a person could afford to buy a television receiver, he could afford to buy a ticket to the fight.

WIDE DIGEST

Large Television a Feature of German Show

● PROJECTED television images, 5x6 feet in size, were one of the outstanding features of the German Television Exposition. A projector is used to throw the image on a wall at some distance from the apparatus. The brilliance of the pictures was fair but definition was reported as being inferior to that had on smaller screens.

No Hams in Greece!

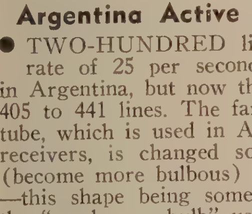
● THE Greek Government has definitely clamped down on all importation of radio transmitting equipment and strictly forbids the use of any transmitters by private individuals. The only exceptions to these rules are three amateurs who have been given special licenses, says *"The Malayan Radio Times."* Indications are that they will be allowed to continue their activities; otherwise only Government departments will be permitted to own and operate radio transmitting equipment, which should effectively stifle Ham activities.

Argentina Active in Television

● TWO-HUNDRED line images at the rate of 25 per second have been used in Argentina, but now the trend is toward 405 to 441 lines. The familiar cathode-ray tube, which is used in American television receivers, is changed somewhat in shape (become more bulbous) in South America—this shape being somewhat like that of the "mushroom bulb" used for lighting in the United States.

Fashions for Hams

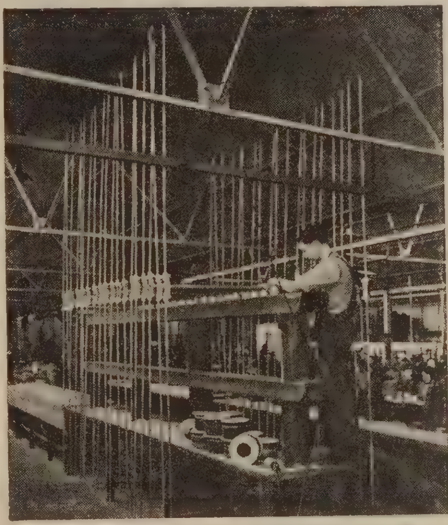
● THE latest style hint on what the well-dressed Ham will wear is shown herewith—his call letters embellishing the back of his workshirt. Newton Moyer, the Beau Brummel of the Short Waves, got himself a silver gray jersey and bought a set of maroon letters from a local sporting goods house. These 3-inch letters have rubberized backs and are ironed on to the shirt, after which they are sewed tight. If the YL or OW can swing a wicked needle, here's a way in which she can co-operate in dressing up the harried Ham.



Or perhaps the Hams will agree with the YL who said "Fashion is Spinach!"

England Today—America Tomorrow?

● TELEVISION activity in England has necessitated the commercial production of ultra short wave antennas for home installation, as this view of the Belling-Lee factories proves. It has been predicted that America's television boom will come early in 1939 and, if so, all the factories which now turn out metal tubing, auto radio antennas and similar products will show similar activity.

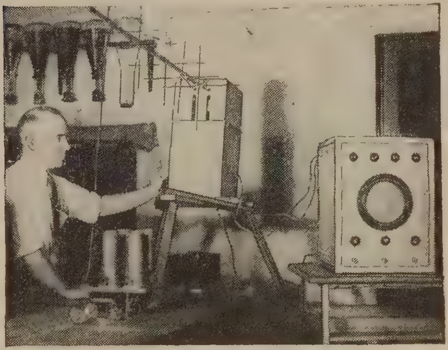


Ireland Rushes Transmitter

● IRISH radio listeners are now trying to get the authorities of Radio-Eireann to hasten construction of the new Eire short-wave station. According to *"World-Radio,"* a British publication, the transmitter now in the course of construction at Moydrum, near Athlone, will be operating with 3½ kw. power before the first of the year. Testing was scheduled to begin as soon as a wavelength had been assigned.

Television Principle in Airplane Beacon

● AT least two American agencies are working along parallel lines to increase the safety of commercial aviation. The illustration shows radio research engineers of Purdue University at work on such a system. The short wave transmitter at the left sends out signals which are picked up on the cathode-ray tube receiver (shown at the right) installed in the plane.



Bell Telephone engineers are working on a similar system, which shows airline dispatchers on the field the exact direction of approaching planes. The cathode-ray tube used in the Bell system will handle as many as ten planes, indicating their direction and distance from the field on the end of a cathode-ray tube marked out with compass bearings. The field may then inform each pilot of his exact position.

Television in the Spring—Sarnoff's Promise

● "THE results of the experimental field tests of television in the New York area conducted by RCA and NBC have convinced us that television in the home is now technically feasible," says David Sarnoff, president of RCA.

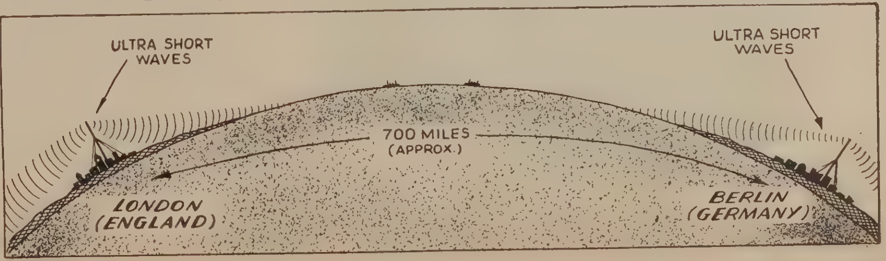
"RCA believes that the development of its television system has reached a stage where it is practicable to supply receivers to satisfy public demand in localities where television transmissions are now or may become available. Therefore, it is planning to manufacture and market a limited quantity of television receivers by the time the New York World's Fair opens. We are informed that a number of other radio manufacturers are also preparing to manufacture and sell receivers.

"We hope that advantage will be taken of these opportunities to build a new industry and establish greater public service."

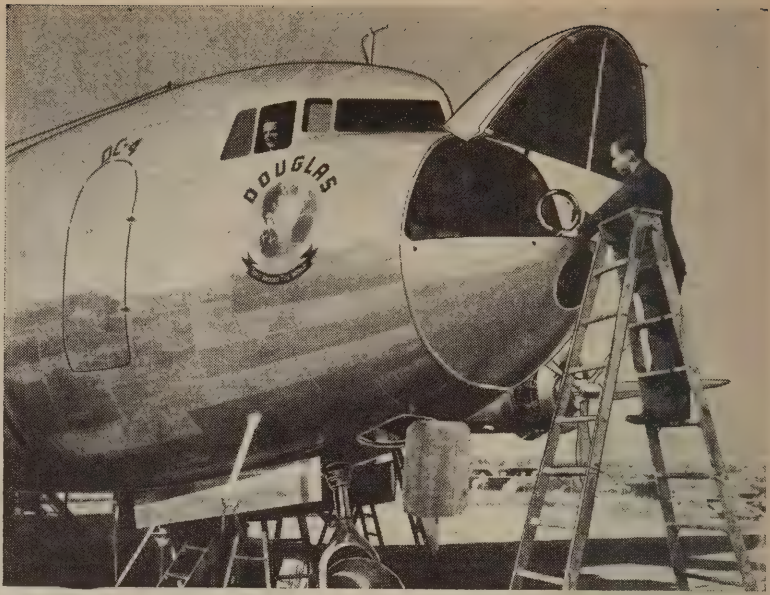
Nations to Dodge Enemy "Jamming"

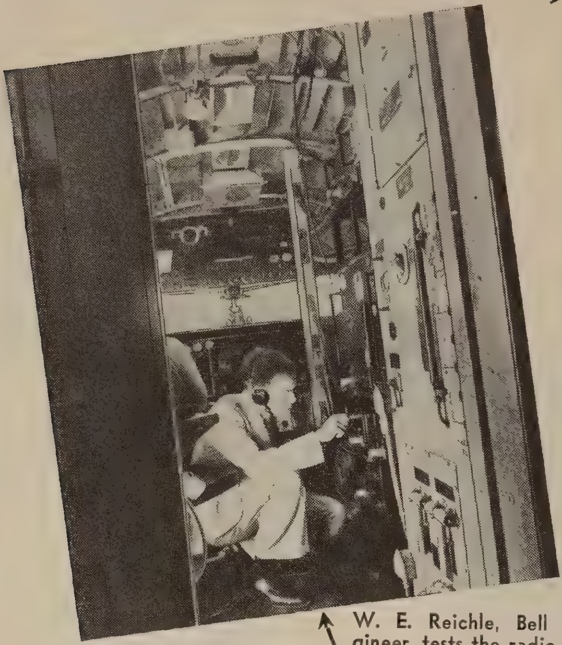
● WHEN national stations send programs of news or propaganda to their own citizens, enemy countries frequently "jam the waves" by sending out interference on the same wavelength. The British Broadcasting Company has perfected plans for obviating such interference.

It has long been recognized that ultra short waves do not carry efficiently beyond the horizon, therefore the British programs of news and other public information will be sent out on these waves. Signals from transmitters on the European continent would have to be on similar waves in order to block the British transmissions and these waves will not travel far enough to affect reception in Britain. Educated to listen on the ultra short waves, it is thought unlikely that the Britons will tune in enemy transmissions on other wavelengths high enough to reach the "tight little isle." Simple, isn't it!



E. A. Post, communications engineer of United Air Lines, inspects the DC-4's direction-finding loop antenna. Two additional receiving antennas are installed beneath the ship and a transmitting antenna above her. →





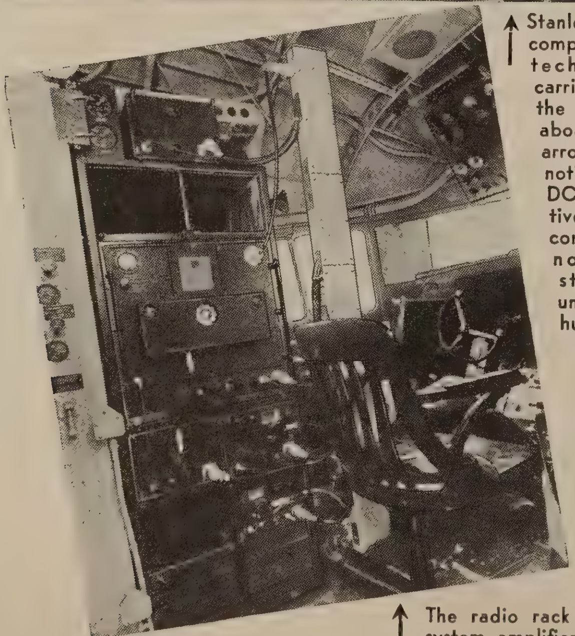
↑ W. E. Reichle, Bell Labs. engineer, tests the radio telephone aboard the 42 passenger DC-4.

Aviation's Newest and Biggest Radio Rig

C. L. Stong

DC-4, new 42-passenger plane, will have 11 units of radio equipment to ensure perfect safety in the air

↑ Stanley Beers, company radio technician, carries one of the receivers aboard (see arrow). Some notion of the DC-4's relative size is conveyed by noting the stepladder under the huge wing.



↑ The radio rack holds the inter-communicating system amplifier; the 250-watt transmitter, and the communications receiver. Auxiliary and beacon receivers are also seen.

Photos courtesy
Western Electric Co.

● WHEN the giant new Douglas airliner DC-4, now undergoing tests at Santa Monica, California, roars into the sky with 42 passengers and three tons of air express, she carries the most powerful and comprehensive radio telephone yet developed for commercial air transport service.

To the air-minded public this means another long stride toward the goal of completely dependable air travel. Radio, and in particular *two-way* radio telephone between the pilot and landing field, has come to occupy such an important position as a navigating instrument, as a means for communicating weather information, and as an aid to flight scheduling and flight control generally, that airline officials now class it second only to the use of multiple engines as a safety device. To those charged with building our air transportation system, progress in aircraft radio as exemplified by the DC-4 equipment also means increased financial security because it enables larger planes, carrying more passengers, to fly longer distances at lower operating costs per passenger mile.

The 250 watt Western Electric equipment installed aboard the DC-4 is five times more powerful than conventional airplane transmitters and includes many unique features. For the first time, a flight crew is equipped to make simultaneous observations of the beacon, weather, and marker signals while holding two-way communication with the landing field. All power is supplied from the ship's 800 cycle auxiliary lighting plant. An intercommunicating system, that may be plugged into regular Bell System lines when the ship is on the ground, connects the pilot, co-pilot, flight engineer, and stewardess. During flight the pilot may talk over any one of ten different frequency bands, and a special direction finding loop enables him instantly to check the ship's position with respect to ground stations.

All major components of the system are assembled to form a panel installed on the "bridge" immediately behind the co-pilot's position. This unit, operated remotely from a master control column which rises between the pilot and co-pilot, is entirely self-contained and is composed of the transmitter; communication, beacon, auxiliary, and marker receivers; and the intercommunicating system amplifier. Individual control panels, mounted at both flying positions, switch either headset independently to any or all receivers without affecting what is heard in the other headset. Facilities are also included in the individual panels for switching the microphones either to the ship's transmitter or to the intercommunicating system; for signalling the various stations connecting with the system; for adjusting headset volume; and for placing the transmitter on the air.

As the ship passes from one radio zone into the next, the transmitter and communications receiver to which it is geared are shifted progressively through five pairs of "day" and "night" frequencies, by means of a rotary dial on the transmitter panel. Instantaneous shift from day to night frequency is effected by a push-pull lever located on the master control column. Quartz-plate oscillators of new and superior design hold the several frequencies within required limits and a forced draft ventilation system cools the active elements of the transmitter with filtered air.

The communications receiver, too, is crystal-controlled and is of the superheterodyne type. Its maximum sensitivity is adjusted from the master control column and thereafter is regulated automatically by a special vacuum tube circuit.

The beacon receiver is basically similar to the communications receiver but differs in its purpose and in several minor features of mechanical design. Provision is made for reception on either a conventional single wire antenna, which is located beneath the fuselage, or from the shielded direction finding loop enclosed within the ship's wooden nose. The receiver is continuously tunable between the frequency limits of 195 and 415 kilocycles by means of an illuminated dial on the control column which also contains the sensitivity control knob and an indexed dial showing the loop position.

An auxiliary receiver, which may be operated from battery supply in event of power failure, covers all of the frequencies to which the pilot would normally have occasion to listen. It is tuned remotely from the control column by flexible shafting.

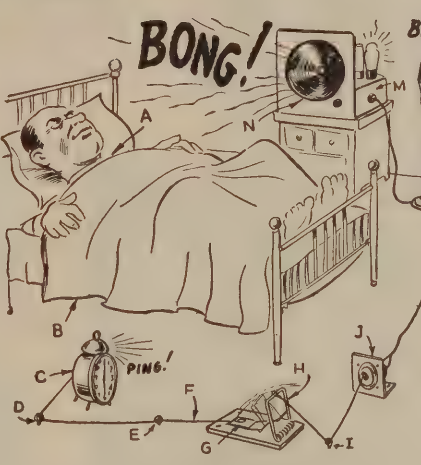
Marker stations are indicated by a series of colored signal lights which appear in the cockpit and which may be augmented by an audio signal heard in the headset. The crystal controlled receiver, which is of the superheterodyne type, requires no operating attention during flight.

Although the importance of this development to the immediate needs of the industry is obvious, its real significance is to be found in the future of aviation. "Over weather" or sub-stratospheric flight has been the dominant ambition of airline operators for more than a decade. Its realization necessitates flying above the clouds, and out of visual contact with the ground for long distances. Hence much of the involved problem of navigation must be shifted from the pilot's limited senses to the broader reach of radio.

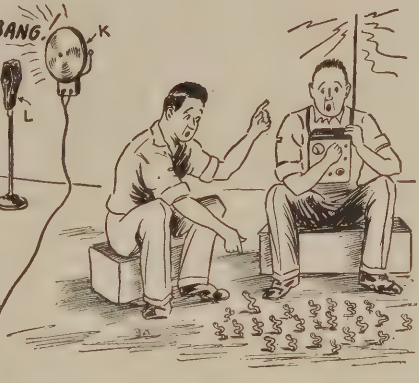
Specifications for the new equipment were submitted by four leading airlines: United Air Lines Transport Corporation; Transcontinental and Western Air, Inc.; American Airlines, Inc.; Eastern Airlines, Inc.; and by the Douglas Aircraft Company, manufacturer of the DC-4. The system was designed by Bell Telephone Laboratories, Inc., and more than two years were required to perfect and complete the initial model.

RADIODDITIES

As it cools WOR's monster transmitting tubes, the water in the system naturally becomes warm. When the weather turned chilly, so many birds bathed in it that their feathers clogged up the strainers in the pumps. So the engineers had to train a spaniel to keep birds away.

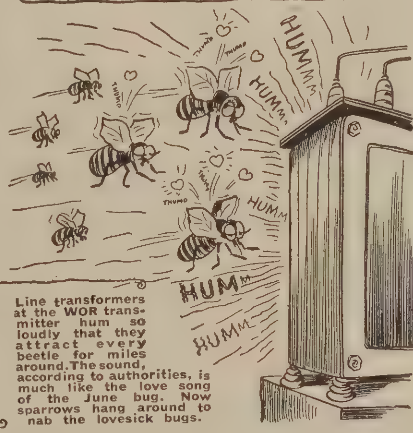


When CBS engineer John Norton worked an early shift, no alarm clock could wake him, so he invented a super-loud system. A—John; B—Bed; D, E and I—pulleys; F—String; G—Mousetrap trigger; H—Mousetrap whammer; J—Switch; K—Gong; L—Mike; M—Amplifier; N—Very very loud speaker. (It worked!)



No more digging fish worms. WOR's engineer finds that a micro-wave pack transmitter drives 'em out of the ground. Moreover, tuning in on the worms' wavelength makes the critters turn out in any size desired. Ain't Science wunnerful?

WOR engineers put copper sulphate in the pool at the transmitter, to discourage bugs from moving in. A visitor discovered that the pool was a wonderful remedy for "Athlete's Foot," so now all the crew dabble their tootsies there.



Line transformers at the WOR transmitter hum so loudly that they attract every beetle for miles around. The sound, according to authorities, is much like the love song of the June bug. Now sparrows hang around to nab the lovesick bugs.

$5.00 for Best "Radioddity"

● THE accompanying pictures show a number of freak radio reception conditions which actually occurred in the vicinity of radio transmitters. The editors will pay a $5.00 monthly prize for the best "Radioddity" sent in by our readers. The description should be about 150 words in length and may be accompanied by a sketch or photo. The occurrences described must be based on fact, like those here illustrated.

If you have never run across any "Radioddity" of any nature, you may be able to act as a reporter for us by interviewing radio friends and engineers, especially those connected with broadcasting stations. You will probably pick up some very amusing Radioddities.

For the best Radioddity submitted each month, the editors offer a $5.00 prize. Others, whose contributions are used, will receive a 1 year's subscription to RADIO & TELEVISION. In the event of a tie between two or more contestants, an equal prize will be awarded to each.

Closing date for the next contest is December 10th. Prize-winning contributions will be published in the February, 1939, issue.

Address all contributions and communications to

Editor, Radioddities
RADIO & TELEVISION MAGAZINE,
99 Hudson Street,
New York, N. Y.

C.B.S. Sets the Stage for TELEVISION

TELEVISION HAS TECHNICALLY BEEN DEVELOPED TO A HIGH DEGREE. THIS ARTICLE PROVIDES THE LATEST INFORMATION. IT WILL BE SOME TIME BEFORE HOME TELEVISION IS REALIZED. THE ART HAS GREAT OPPORTUNITIES FOR EXPERIMENTERS AND TECHNICIANS.

● EXPERIMENTERS equipped with television receivers will have a second source of television programs to tune in on shortly after the first of the year when the Columbia Broadcasting System's new television transmitter in New York City will be completed. This station is expected to cover a radius of about 40 miles (an area of about 4,800 square miles). Field tests have indicated that under good transmission conditions, the signals from such a station may be picked up at distances greatly in excess of 40 miles, possibly 75 to 80 miles.

The $500,000 transmitter is being installed in the Chrysler Building at an elevation of 874 feet. The higher the antenna, the greater the range of transmission for the ultra short waves used in television.

Dr. Peter C. Goldmark, Columbia's chief television engineer, has charge of the installation. There will be 16 dipole antennas —8 for sound radiation and 8 for visual images. All antennas will be heated electrically by a thermostat control in cold weather so that ice cannot form on them.

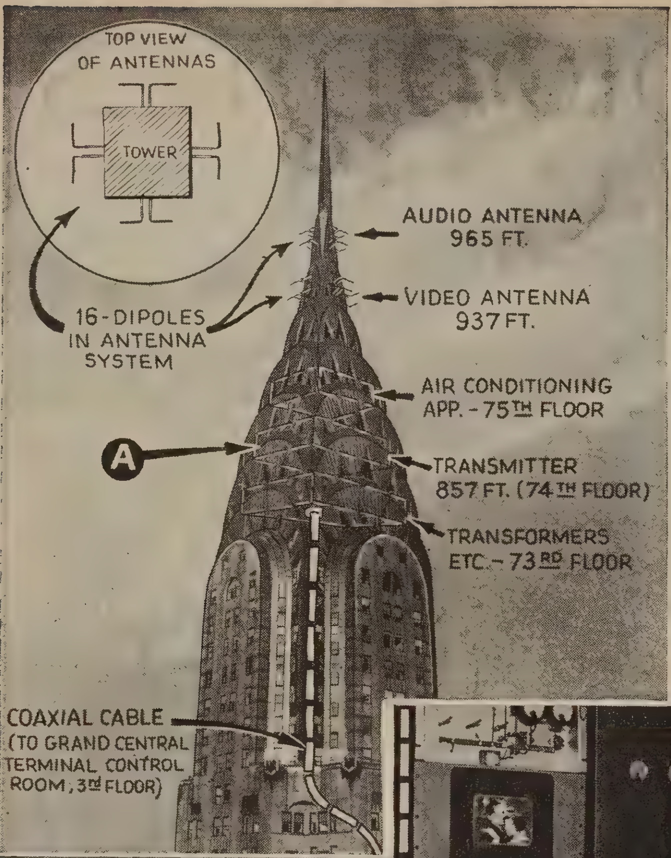
Powerful transformers and reactors are being installed on the upper floors of the Chrysler Tower to supply this new vision transmitter with the necessary power, totaling 1,300,000 watts. Of this great power, the transmitter will use about 300,000 watts for sending out the high-definition 441-line picture signals.

The image signals will be broadcast on frequencies between 51 and 52.5 megacycles. The sound will be broadcast on 55.75 megacycles.

The principal television studio is being erected in Grand Central Railroad Terminal in New York City, a short distance from the Chrysler Building. Additional studios will be fitted up later. The studio control room will be connected with the television transmitter by means of a coaxial cable, of the same size as that now in use for experimental tests between New York and Philadelphia. This cable is ⅞" in diameter and one spare coaxial channel is incorporated in the cable.

The vision transmitter is located on the 74th floor of the Chrysler Tower, while air conditioning apparatus is located on the 75th floor. On the 73rd floor are the power transformers, reactors, motor-generators and water-cooling system for the power tubes.

The call letters of CBS's new television transmitter are W2XAX. Due to the very high voltages used on the tubes of the transmitter, special safety devices are provided to protect the engineers in charge. All doors to the transmitter room proper and also high voltage equipment, will be fitted with *interlock* switches to cut off the power automatically whenever any door or panel is opened.


TOP VIEW OF ANTENNAS
TOWER
AUDIO ANTENNA 965 FT.
VIDEO ANTENNA 937 FT.
16-DIPOLES IN ANTENNA SYSTEM
AIR CONDITIONING APP.-75TH FLOOR
A
TRANSMITTER 857 FT. (74TH FLOOR)
TRANSFORMERS ETC.-73RD FLOOR
COAXIAL CABLE (TO GRAND CENTRAL TERMINAL CONTROL ROOM, 3rd FLOOR)

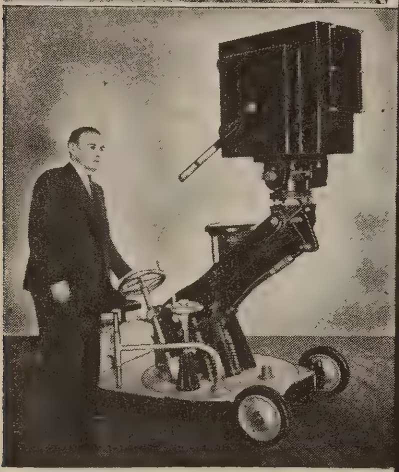
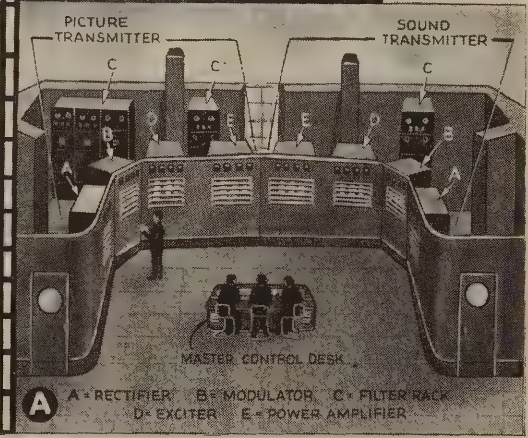
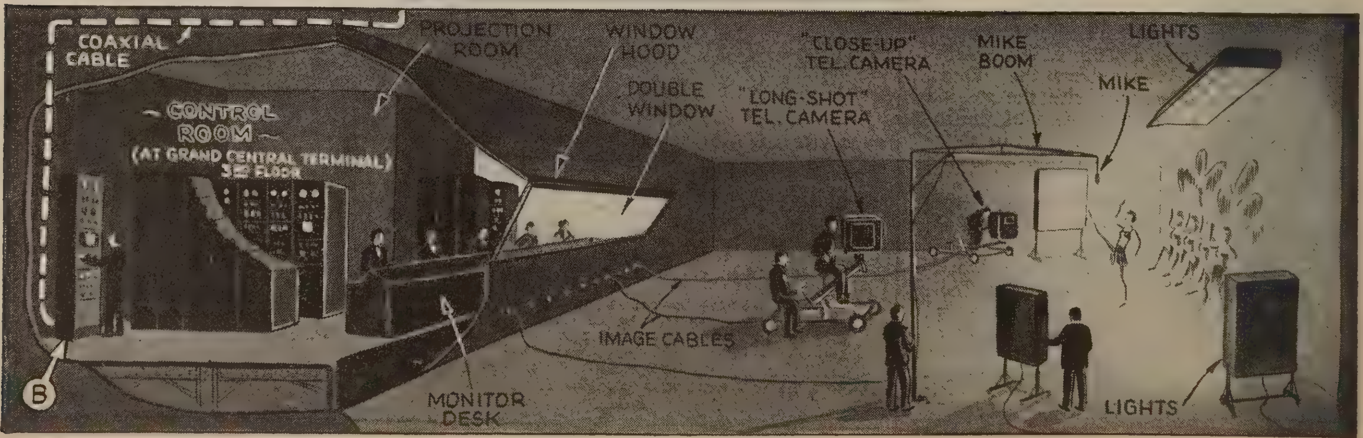


Photo above shows a CBS television camera used for picking up the image in the studio. Dr. Goldmark, CBS television engineering director, is shown at one of the monitor control panels, in photo at right, and just below it, is a glimpse of the television transmitter itself. Below—Television studio.


PICTURE TRANSMITTER
SOUND TRANSMITTER
C
C
C
B
B
D
E
E
D
A
A
MASTER CONTROL DESK
A
A = RECTIFIER B = MODULATOR C = FILTER RACK
D = EXCITER E = POWER AMPLIFIER



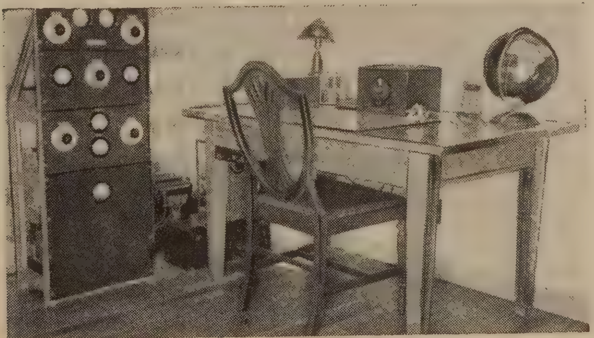
with the YL's

▲DECORATIVE Elizabeth M. Zandonini (W3CDQ) got her commercial ticket in 1917, her ham license in 1922. She operates on 7, 14 and 28 mc., and works in the Natl. Bureau of Standards, in Washington. She answers letters, makes translations and helps maintain the primary standard of R.F.

▲CHARMING Eve Sanford (W4DAI) is the wife of another ham, Dr. E. F. Sanford (W4DHM). She operates exclusively on cw, on the 40 meter band, and has had her license since June 29, 1934. Eve is a member of AI Operators, N.W. Ga. Radio, and Rag Chewers clubs; has her WAC and WAS on 40. She can send and receive upward of 55 words a minute, though 40 is her normal rate.

▲INTENT upon her rig is Ethel Clark (W8PXE), who has the works built into a folding desk, so that it can be locked away from her two small sons. Her husband, whose hobby is radio construction, built the rig. A ham for 2 years, she hopes to add another band to her program soon.

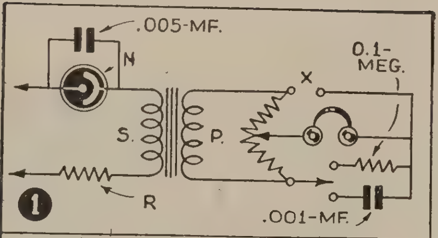
▲
NONCHALANT Mary E. Roden (W7GPO) is an XYL like her pal, Margaret E. Willcutt (W7GQK). They're the only two of that class in their county. The two girls studied together for a year and built an 80 meter transmitter in preparation for the license exams, which they passed last January. Margaret operates on 10, 20 and 40 meters, Mary mostly on 28 mc.

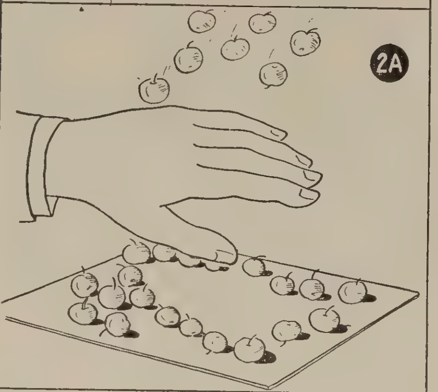


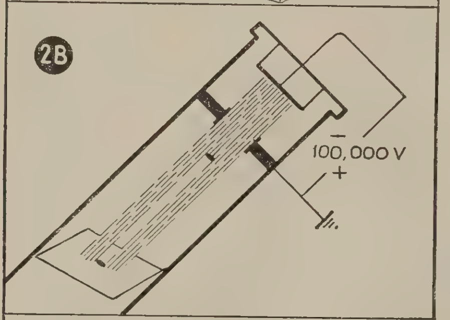
◄
CAPTIVATING Mae E. Amarantes (W6DHV) has been a 100% cw ham since getting her license early in 1931. She's the first YL to get a license in her section, and built her first rig with her own fair hands. Her best DX was achieved on that outfit. Mae is an active member of the ARRL, but gets most fun from rag chews. She's an XYL.

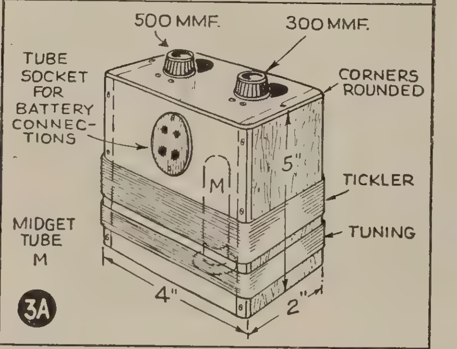
INTERNATIONAL

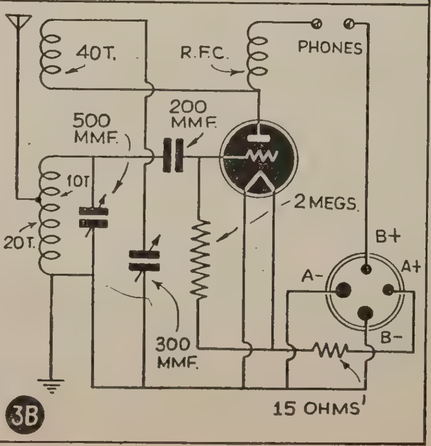
Latest Radio Developments











"C" and "R" Meter

1 A simple meter for testing capacity or resistance is described in "Practical and Amateur Wireless" of England. Fig. 1 shows the circuit. The oscillations are generated from a D.C. source by means of a small neon bulb paralleled with a fixed condenser. The transformer has a 1:1 ratio. The potentiometer is 10,000 ohms and is provided with a pointer having two arms to read on two separate scales—one indicating resistances; the other, capacities. The voltage source may be from 120 to 240, obtained either from a well-filtered lighting line or batteries, or a well-filtered rectifier. The component under test is connected across the X terminals, the line current switched on and the potentiometer varied until the hum heard through the phones dies away. Too high an input voltage will make this point hard to locate. While logarithmic means of calibrating the instrument may be used, it will be simpler to connect various values across the X point and draw up a scale from these known values filling in any intermediate points.

The Super Microscope

2 Television principles are employed in the latest type of microscope, as described in *"Radio-Amateur,"* a German publication. Wave lengths of light make it impossible to get exceedingly great magnification using optical systems. Therefore, an electronic means whereby a stream of electrons is impeded by the object to be magnified and is then caused to spread over a fluorescent screen, has been devised. Fig. 2A gives an analogy, the electrons being represented by apples. Fig. 2B shows the principle of the microscope, but does not indicate the beam spread; so you see where no beam spread is used, the size of the image on the fluorescent screen would equal the size of the object. Magnifications up to tens of thousands of diameters are possible.

Quickly Made One-Tube Receiver

3 When the radio set breaks down just before the big fight, you do not need to miss it. A box 2" x 4" will serve not only as the cabinet but as the coil form as well. The feed-back coil may be 40 turns of No. 30 enameled wire, while the grid coil is 30 turns of the same size wire tapped 10 turns from the end nearest the feed-back coil. The layout is shown in Fig. 3A; the circuit in 3B. The tube socket is mounted inside the bottom of the box and the condensers on the top. While a ground is not entirely essential on this set, it is apt to oscillate unless one is used.—*Practical & Amateur Wireless (London).*

Experimental 1¼ Meter Transmitter and Receiver

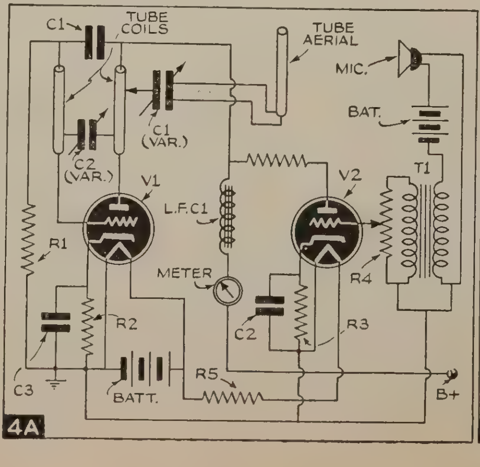
4 "Television and Short-Wave World" of Britain shows an interesting experimental 1¼ meter (240 mc.) transmitter and receiver. Fig. 4A shows the transmitter; Fig. 4B, the receiver. These may be breadboard models and the designer, Geoffrey Parr, reported good success with this type of construction. In Fig. 4A, V-1 is an Acorn tube; V-2 is a high-gain audio frequency amplifier. In Fig. 4B, V-3 is also an Acorn while V-4 is any standard A.F. amplifier tube. Condenser C-1 should be of the ceramic type; R1, a 5000 ohm, ½ watt resistor. Other values are shown in the accompanying table.

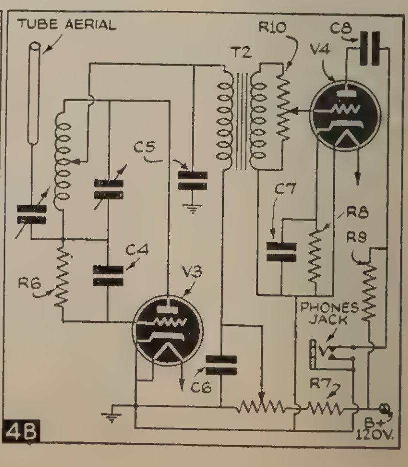
C1	1000 mmf.	R2	450 ohms
C2	10 mf.	R3	500 ohms
C3	10 mf.	R4	100,000 ohms
C4	50 mmf.	R5	Optional—see text
C5	100 mmf.	R6	10 megohms
C6	.01 mf.	R7	20,000 ohms
C7	10 mf.	R8	500 ohms
C8	.01 mf.	R9	75,000 ohms
R1	5,000 ohms		

In building the transmitter, use the Acorn socket as a starting point, positioning everything else as close to it as possible. The same holds true for the receiver. The aerial should be slightly under ⅛ of a wave length and should be mounted on two stand-off insulators on the side of the chassis. If the tuning condenser C-2 seems to have too much capacity, shorten the aerial; if too little, lengthen it. For the receiving aerial, a half wave length is recommended as superior to the ⅛ wave. The usual means of tuning the set are employed.

Regeneration in Superhets

5 Far more effective than ordinary receivers is a single signal receiver. One way of achieving this is to use a crystal

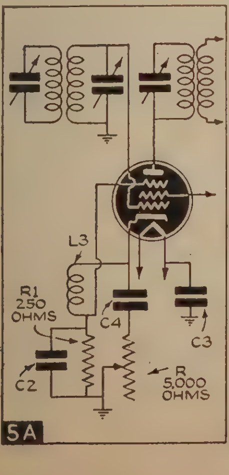


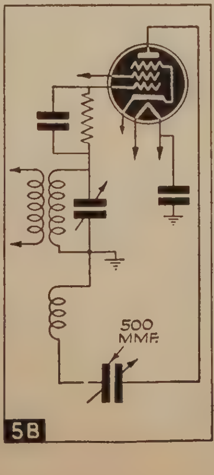


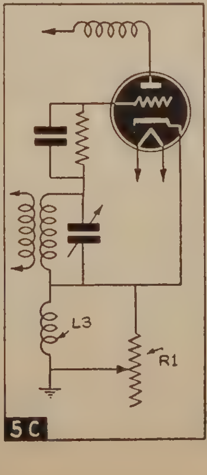
RADIO REVIEW

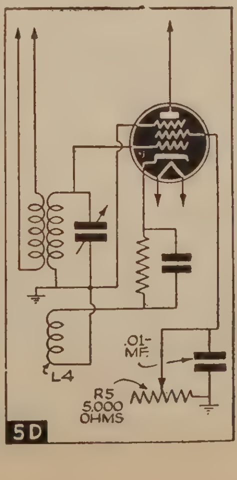
from World-Wide Sources

filter. Equally good and less costly is to add regeneration in the I.F. and R.F. In the I.F., regeneration works much like a regenerator first detector. The standard 465 kc. transformer takes an additional winding of 25 turns of No. 33 D.S.C. jumble-wound in the same direction as the grid coil, and at its ground end. Fig. 5A shows the connections. The feed-back coil is L3, with resistor R acting as a control. C4 prevents shorting the cathode resistor. Fig. 5B shows a system employed where no I.F. stage is included in the set. Fig. 5C shows cathode injection. In making this change in your set, remember that long leads or poor shielding will cause instability, according to "Television & Radio Bulletin." Cathode feed-back in the frequency changer stage is shown in Fig. 5D where R5 is the regeneration control. Electronic means of securing the same effect are also possible.


5A

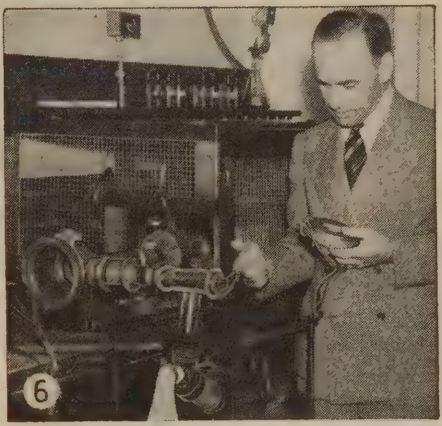

5B


5C


5D

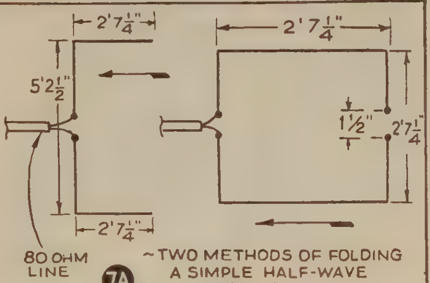
Pump Keeps C. R. Vacuum High

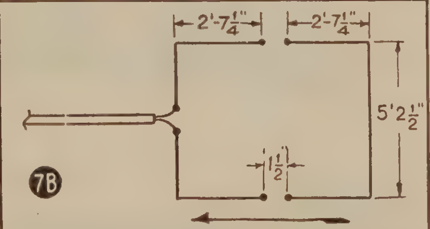
6 Gilbert Seldes, dramatic director of Columbia Broadcasting System's Television Division, is seen pointing at a pump which is connected to a metal cathode-ray tube. The end of the tube which bears the fluorescent screen has been removed and is held in Mr. Seldes' left hand. This type of tube is made to be operated while under continual exhaustion by the vacuum pump, and although it is not practical for a home television set, it has various advantages in the laboratory.

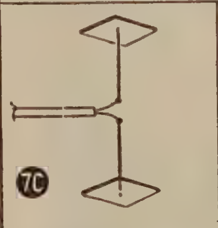

6

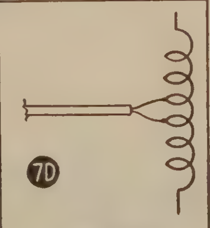
Efficient Television Aerials

7 As television approaches more closely in the United States, more thought must be given to compact antennas suitable for apartment house installations. Fig. 7A shows two means in which a simple half-wave dipole may be folded to conserve space. Fig. 7B shows how a folded reflector may be used with an aerial of this type. Such a reflector will increase gain to a marked extent. Fig. 7C shows still another means of reducing antenna lengths. In this case, metal plates are affixed to the ends of the dipole—a form of capacity loading. Twelve-gauge wire is heavy enough to support such copper plates. Fig. 7D shows another means of loading—this time by inductance. The typical example of this type would be an aerial having an overall length of approximately 6 feet, loaded with an 18-turn inductance, air-wound to a diameter of about 1⅜ inches. Cut-and-try methods on the aerial will be necessary to afford best response on 6¼ meters.—*Telev. & S. W. World (London).*


7A
~TWO METHODS OF FOLDING A SIMPLE HALF-WAVE AERIAL~


7B
-A FOLDED HALF-WAVE AERIAL WITH REFLECTOR-


7C
~CAPACITY LOADED AERIAL~

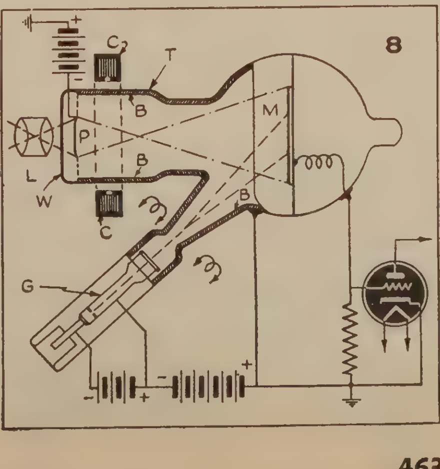

7D
~INDUCTANCE LOADED AERIAL~

Latest Television Camera

8 The Super Emitron, a new type of television pickup tube, which is now being used for all outside broadcasts by the British Broadcasting Co., represents a considerable improvement on the old type. A beam of electrons from a conventional electron gun *G* scans a mosaic *M* similar to that of a standard Emitron, except that in this case the mosaic elements are not photo-sensitive. In fact, the charge-storage electrode may now be a plain sheet of mica backed by a metal signal plate. The optical image is focused by a lens *L* onto a conducting transparent photo cathode *P*, which is supported on a thin sheet of transparent material (e.g., glass or mica) situated close to a polished glass window *W*.

The light liberates photo-electrons from the side of this photo cathode opposite to that on which it falls, these electrons having the same distribution as the light in the optical image. The electrons are accelerated by an electric field between the cathode which is held at about –500 volts, and the metal coating *B* on the internal walls of the cylindrical glass tube *T*. This coating is an extension of the second anode of the electron gun, and both are held at ground potential.

Encircling the glass neck *T* is an iron-clad magnetic coil *C*, which forms a magnetic electron lens and enables the electrons that leave the cathode to be brought to a focus on the surface of the mica mosaic. These electrons liberate several secondary electrons each when they impinge on the mica surface, and these secondary electrons now assume the same role as the photo-electrons that are ejected from the mosaic of the tube by light. From this stage onward the mechanism of signal production is essentially the same as that in the standard Emitron.—*Television & S. W. World (London).*



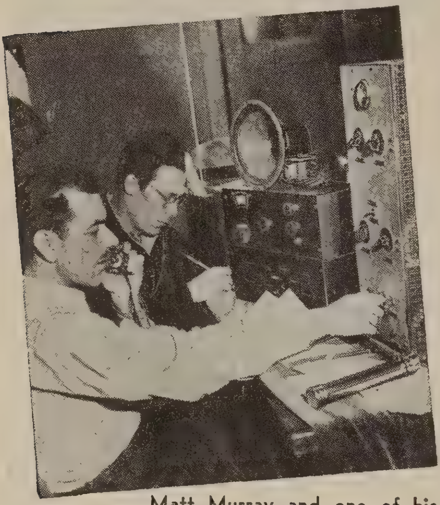
The good ship "We're Here"—one of the finest schooners in American coastal waters—scuds across the sea as the radio waves direct her.

Freddie Bartholomew became so interested in radio that he persuaded Radio Chief Matthew Murray to help him try for a 3rd Class Amateur Phone License.

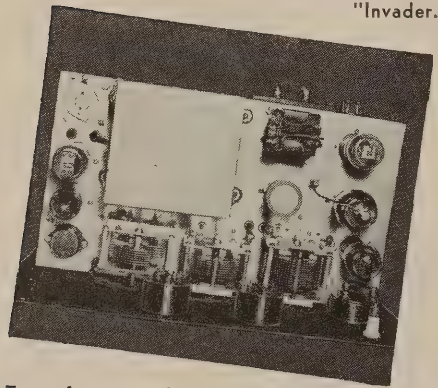
How *Radio* Helped to Film "Captains Courageous"

J. M. Goldby

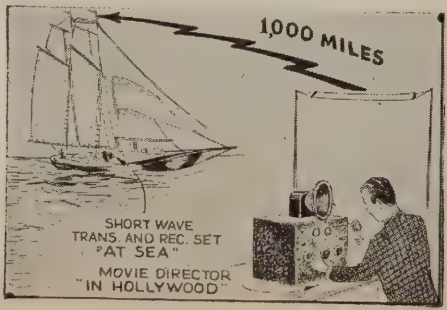
The inside story of how a Radio Amateur made it possible for Hollywood to film a thrilling sea saga.



Matt Murray and one of his assistants working the "We're Here" from their shack on the "Invader."



Top of xmtr. 42's as oscillator and speech amplifier, 802 final stage, 6A6 Class B modulator; built-in genemotor; 2 xtals; Collins network permits use of any length antenna. Net weight, 30 pounds. BELOW: Director ashore listens-in and directs action at sea.



1,000 MILES
SHORT WAVE TRANS. AND REC. SET "AT SEA"
MOVIE DIRECTOR "IN HOLLYWOOD"

● RADIO played an important rôle and added another new field to its already numerous uses when it aided in the filming of the sea sequences of the motion picture, *Captains Courageous.* For the first time it became possible to *take* scenes which, without the use of radio, would have been much too dangerous to attempt. When the first previews of this film were shown to movie critics and to men versed in the technique of motion pictures, they thrilled to and marveled at the scene where the *We're Here* and the *Jennie B. Cushman* almost collided during the race toward their supposed port. This was one of the hundreds of dangerous shots that was taken, made possible only because the pilots of both vessels heard the directions fired at them by the Director instantaneously and simultaneously. Each skipper knew which way the other was going to turn. It was a difficult and dangerous maneuver which was arranged only by good *radio* equipment and efficient *radio operators.*

This was the consensus of opinion of the entire staff of photographers and technicians who worked on the picture and is explicitly summed up by Mr. Lester White, Metro-Goldwyn-Mayer's Director of Photography for the sea scenes, "I emphatically state that it would have been impossible to take most of the thrilling scenes and it would have been suicide to attempt to maneuver the ships into such dangerous positions *without radio's aid!* I've been filming *sea sequences* for the past few years and can definitely state that any company who attempts to shoot sea scenes *without the aid of radio* will pay ten times the normal cost in money, time and aggravation for every one concerned."

A veritable flotilla sailed out of Los Angeles harbor for the open expanse of the Pacific Ocean, deliberately aiming for the nearest storm center. Consisting of thirteen sailing vessels, three tugs and sixty dories, this motion picture unit carried, in addition to its regular equipment of cameras, technicians, cast of actors and directors, a little-known piece of apparatus especially built for this job, plus the knowledge and ability of Matthew Murray, ace *Ham* operator, W6OJL, and holder of a Commercial First Class phone ticket.

When Director James Havens first conceived the idea of using radio in motion picture directing, he knew that some special equipment would have to be built to fit into his specifications because of the unusual work such apparatus would be called upon to perform.

L. W. McDowell of Long Beach, Calif., took all the requirements into consideration and finally built the transmitter shown here into its compact casing, using but 30 major parts in the entire assembly. This "rig," with an input power of only 10 watts, was able to put 80 microamps into KOU's antenna at 1300 miles and at no time was ever out of communication with this San Pedro station. It uses a 42 oscilla-

(Continued on page 511)

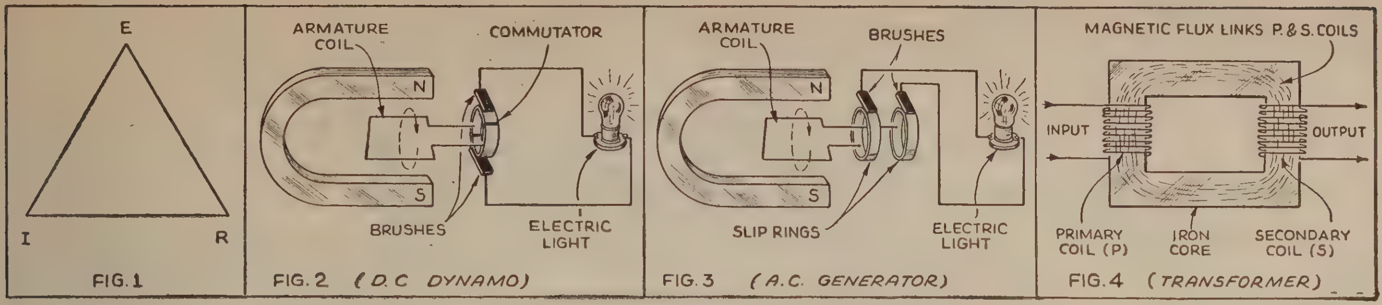


FIG. 1 FIG. 2 (D.C. DYNAMO) FIG. 3 (A.C. GENERATOR) FIG. 4 (TRANSFORMER)

Memory trick for Ohm's Law; D.C. & A.C. dynamos; and a transformer.

The Radio Beginner—Lesson 2

How Electricity Is Generated and Measured

Martin Clifford, W2CDV

IN the first article of this series we discussed such terms as *current, voltage* and *resistance.* It is no haphazard chance that these terms are grouped together, and no accident or coincidence that a discussion of one usually involves the other two. Current, voltage and resistance are directly related—for if we know any two of these terms, we can always find the third through the use of a very simple, but exceedingly important formula known as *Ohm's law.* Briefly stated, Ohm's law (named after the man who first formulated it) is:

$$E = I \times R \qquad I = \frac{E}{R} \qquad R = \frac{E}{I}$$

Since it would be very cumbersome to write out the words—voltage-current-resistance in the formula, we simply substitute alphabetical letters for them. Thus, for example, we let the capital letter E stand for voltage; I for current (in amperes) and the letter R for resistance (expressed in ohms).

We need not make any effort to memorize this simple formula, since there is a very easy way of remembering it. Simply draw a triangle, as shown in Fig. 1. Place the letter E on top, the letter I in the lower left-hand corner and the letter R in the remaining corner. Using the triangle is not at all difficult. To find the voltage, just cover the letter E at the top of the triangle with your finger—and you have the answer—I times R. If we wished to find the resistance, we would just cover the letter R with our finger and the answer would be E over I. To find the current, we would cover the letter I and the answer would be E divided by R (or E over R).

At the close of the previous lesson we discussed *alternating* and *direct* current—now let us see how these currents are produced.

How Current Is Produced

We have already seen that a permanent magnet has a magnetic field about its poles. We have also shown that if we took this permanent magnet, and plunged it in and out of a coil of wire, a galvanometer connected to the coil would show a reading. If, instead of moving the magnet in and out of the coil, we moved the coil and kept the magnet still, the result would be exactly the same. Here, then, we have the basic idea for generating current . . . . simply take a permanent magnet and revolve a coil of wire around it.

In Fig. 2 we see the elementary principle of the D.C. dynamo. We are already familiar with our old friend the permanent magnet. The part labeled "armature coil" is nothing more or less than a coil of wire. This coil of wire is mounted on a shaft. The shaft is not shown in the drawing since it is purely a mechanical feature and need not concern us here. When the armature coil of wire starts to revolve between the poles of the magnet, a current of electricity is generated in the coil. However, the current in the coil would be of no use to us, unless we could in some way draw it off and put it to use. This is done by connecting the armature coil (as shown in the sketch) to a *commutator.* The commutator in its simple form is a copper ring, the two halves of which are separated by a bit of insulating material. Since the commutator is connected to the armature coil, it rotates with it. In order to utilize the current in the rotating commutator, we place brushes of copper mesh in contact with the commutator. We can now light up a lamp by connecting it across the commutator brushes. To sum up—a D.C. dynamo may be simply a coil of wire moving in a magnetic field, plus a provision for leading the current away from the moving coil by means of sliding contacts.

The generation of *alternating* current follows the same principle, except that two *slip rings* are used to draw off the current instead of using a commutator (shown in Fig. 3). Naturally, the generators we have shown are the simplest types imaginable. Modern generators do not use permanent magnets, but use relatively soft iron over which are wound coils of wire (carrying current) to produce the magnetic effect. The amount of voltage and current that we can get out of our generator depends upon the strength of the magnetic field, the size of the wire, the number of turns that constitute the armature coil, and the speed with which we rotate the armature coil.

Transformer Action

Now that we have produced alternating

(Continued on page 500)

Schematic of transformer and three types of meter movements.

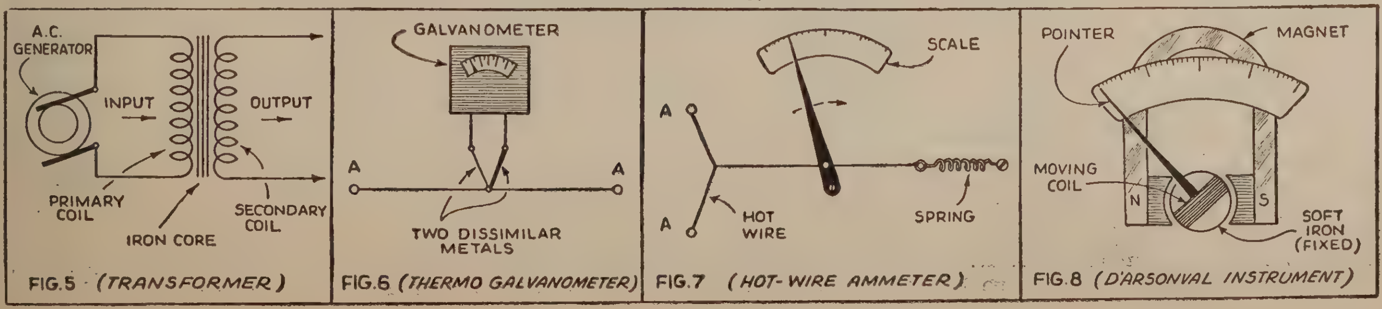
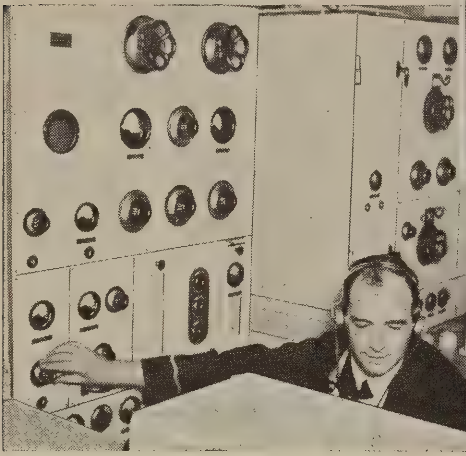
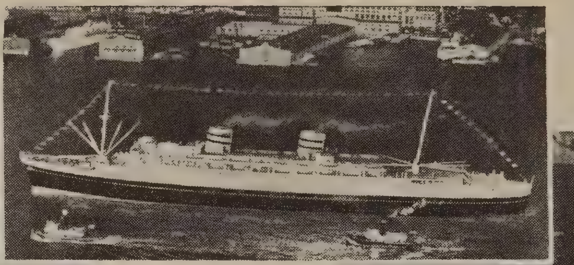


FIG. 5 (TRANSFORMER) FIG. 6 (THERMO GALVANOMETER) FIG. 7 (HOT-WIRE AMMETER) FIG. 8 (D'ARSONVAL INSTRUMENT)

Short Waves Featured on SS. "Nieuw Amsterdam"

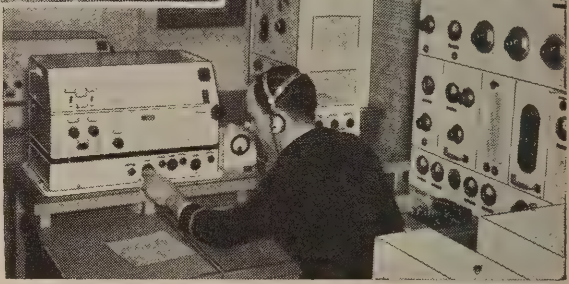
Below—Another view of radio cabin aboard the "Nieuw Amsterdam." The operator is adjusting the speech volume control on the radiophone transmitter.





Above—The palatial new liner — SS. "Nieuw Amsterdam" entering New York Harbor. Note the comparative size of the tugboat and buildings.

Below—Radio cabin aboard the new Holland-America liner, the SS. "Nieuw Amsterdam" which is equipped with Bell system ship-to-shore service. Operator is tuning the radio phone receiver.



(Photos of radio cabin courtesy A. T. & T. Co., Long-lines Department)

● THE magnificent new Holland-America liner, the *Nieuw Amsterdam,* features short waves to a great extent. One of the accompanying photos shows one of the radio operators tuning the Phillips receiver, while another photo shows a good view of the various transmitters on the ship.

The amount of radio traffic handled on a trip across the Atlantic on such a palatial passenger steamship as the *Nieuw Amsterdam* may be readily visualized, and the several transmitters are on more or less constant duty during a great part of the trip across the ocean. Passengers can talk from the ship to shore at any time, thanks to the special radiophone transmitter with which the ship is equipped.

The main radio transmitter on the *Nieuw Amsterdam* is rated at 800 watts and can be operated on all wavelengths between 600 and 800 meters (code).

The main receiver tunes to all wavelengths between 1800 and 24,000 meters.

A short-wave transmitter (code), rated at 200 watts, operates on all wavelengths between 17 and 55 meters.

An *emergency* radio transmitter (code), of 100 watts rating, can be operated on any wavelength between 600 and 800 meters.

The ship-to-shore short-wave phone transmitter, for the use of passengers, is rated at 500 watts and can operate on any wavelength between 16 and 90 meters. It is equipped with a special scrambler which renders the transmitted voice unintelligible if it should be picked up on any ordinary short-wave receiver.

Radio Talks from a Guiana Jungle

"On one occasion, a particularly vicious wasp bit me in the side . . . and my yell was heard coast-to-coast."

● RADIO may be old stuff in the United States, but the citizens in the interior of British Guiana still do not understand it, according to Orison Hungerford, operator of the Terry-Holden Expedition station VP3THE, who relayed a series of programs from the tropical jungle to the National Broadcasting Company networks.

"Our camp was some 600 miles up the Essequibo and Rupanuni rivers," said Hungerford, "and after we set up the radio shack we began to receive visitors. For a couple of weeks the most faithful of these were a group of Wai-wai Indians, who came to inspect the radio equipment and everything else we had. These Indians, who came decked out in their finest paints, must be the most curious people in the world. They didn't steal anything, but they did inspect everything around the radio shack. If there was something they didn't understand they'd simply break out in loud laughter. It took radio to make them serious.

"The ringleader of these Wai-wai Indians was a tall, handsome fellow. One night when we were working and our visitors were all gathered around I put the earphones on this fellow's head. Blank amazement. His eyes moved first to left, then to right. I took the phones off a minute and he still stood there. All this time there was never a word except those he heard through the earphones. He gave one final look around the shack and then turned on his heel and walked out. All the rest followed in silence. And that was the last we saw of our Wai-wai friends. They're probably walking yet.

"Then there was a little girl who came with her mother. She listened to the strange noises coming out of our receiver while we were talking to NBC in New York. She looked first under the table, then up at the ceiling to find out where the voice was coming from. Then she went outside and looked up at the roof. All of a sudden there was a loud wail. The only way we could stop her was to let her

"We were soaked, but we kept our date with the radio audience . . . and it gets cold—even in the jungle!"

(Continued on page 485)

RADIO *Test Quiz???*

Meet Your Professor — Robert Eichberg

Pit your brains against the best brains in radio!

Every month The Old Professor will back some leader in the radio field into a corner and test his general knowledge with the QUIZ. The expert will not be given a chance to see the questions in advance, or to look up the answers in reference books. There's no cribbing under The Old Professor's eye.

R. D. Washburne, Managing Editor of Radio-Craft, was this month's victim. After 32 minutes spent on the QUIZ, Mr. Washburne emerged with a score of 82½% and a slightly dazed expression.

Now see what you can do. To calculate your rating, credit yourself with 4% for every question you answer completely right; 2% for every question you get half right, etc. Average scores are: Beginners, under 50%; Experimenters and Servicemen, 50 to 75%; Experts, 75 to 95%; Wizards, over 95%.

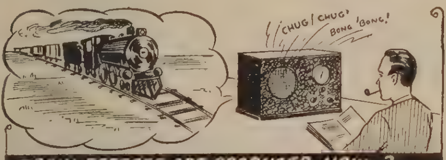
Which are you?

1. In the following list, one of the items is as out of place as a tramp at the Ritz. Can you find it and tell why?

a. Bleeder.
b. Trimmer.
c. Oscillation suppressor.
d. Potentiometer.
e. Volume control.
f. Rheostat.

2. In most major broadcasting stations, the sound effect of a railroad train is produced

a. By rubbing two pieces of sandpaper together.
b. By making sounds with the mouth.
c. From a phonograph recording.
d. By scuffing the feet on a sounding board.


CHUG! CHUG!
BONG! BONG!

TRAIN EFFECTS ARE PRODUCED HOW ?

3. The tube charts list certain tubes as "general purpose tubes", but which of these jobs can't you use them for, satisfactorily?

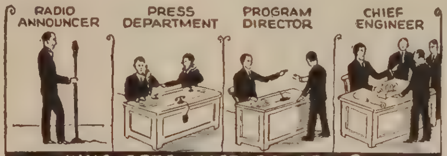
a. R.F. amplifier.
b. A.F. amplifier.
c. Power output.
d. Detector.
e. Rectifier.
f. Oscillator.

4. Match up the meters listed in one column with the items to be tested, in the other.

a. 0-50 ohms	*A. Power rectifier output potential.*
b. 0-50,000 ohms	*B. Filament potential of battery set*
c. 0-10 volts D.C.	*C. Potential drop in bleeder.*
d. 0-10 volts A.C.	*D. Resistance of bleeder.*
e. 0-1000 volts D.C.	*E. Filament rheostat of battery set.*
f. 0-1000 volts A.C.	*F. Potential across power transformer secondary.*
g. 0-10 ma.	*G. Output to speaker voice coil.*
h. 0-10 amps. A.C.	*H. Screen grid current in R.F.*

5. If your boss told you to get him a crystal so that he could make a microphone, he might fire you if you didn't come back with a

a. Rochelle salt crystal.
b. Galena crystal.
c. Quartz crystal.
d. Carborundum crystal.
e. Piezo-electric crystal.
f. Silicon crystal.



WHO GETS MOST SALARY ?

6. In broadcasting stations, which of the following jobs pays the highest average monthly wage?

a. Announcers.
b. Press agents.
c. Program directors.
d. Chief engineers.

7. Ignoring any other advantages or disadvantages, which may be inherent, which type of contact between a shaft and bearing gives the best electrical connection?

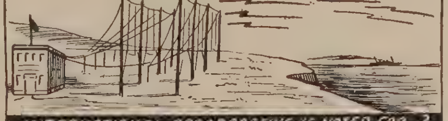
a. Pigtail.
b. Wiping.
c. Sliding.
d. Rolling.

8. A photo-electric cell can be used to advantage in all but one of the following. Which is the outcast?

a. Burglar alarm.
b. Light meter.
c. Television pick-up.
d. Motion picture sound system playback.
e. Motion picture sound system recording.
f. Smoke density meter.

9. In the recent European unpleasantness (just before the Four-Power Conference) it was said that Radio was especially deserving of mention as:

a. A means for spreading propaganda.
b. A means of spreading international good will.
c. An aid toward the preservation of peace.
d. Good for light entertainment, but nothing more.



INTERNATIONAL BROADCASTING IS NOTED FOR ?

10. Of course you knew all along that the purpose of a *volume-expander* is to

a. Make weak stations come in with more volume.
b. Increase the volume of all stations.
c. Increase the apparent volume of loud passages in reproducing voice or music.
d. Increase the apparent volume of soft passages in reproducing voice or music.

11. In putting up an outdoor antenna, many radio men use stranded enameled wire because

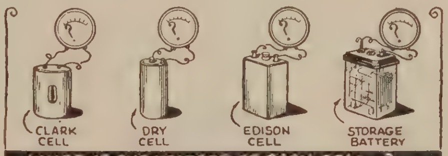
a. It looks better.
b. It does not corrode so rapidly.
c. It offers a greater surface area.
d. It is cheaper in the long run, as it lasts longer.

12. You ought to be ashamed if you don't know that the intermediate frequency in a superhet is obtained by

a. Adding the frequency of the incoming wave to that of the locally generated oscillation.
b. Subtracting the frequency of the incoming wave from that of the locally generated oscillation.
c. Modulating the locally generated oscillation with the envelope of the incoming wave.
d. Subtracting the frequency of the locally generated oscillation from that of the incoming wave.

13. A rabid radio fan wants to send his favorite star a birthday present. So whose birthday is which?

a. Bing Crosby	*A. Dec. 25, 1893*
b. H. V. Kaltenborn	*B. July 28, 1901*
c. Bob Ripley	*C. May 2, 1904*
d. Lowell Thomas	*D. April 7, 1891*
e. Rudy Vallee	*E. April 6, 1892*
f. Walter Winchell	*F. July 9, 1878*



WHAT IS THE VOLTAGE OF EACH CELL ?

14. Just to be unreasonable, let's hear you give the correct voltage of each of these cells.

a. Clark cell.
b. Standard dry cell.
c. Edison (alkaline) storage cell.
d. Standard (lead-acid) storage cell.

15. Maybe you're too young to have heard of Jack Binns, but we oldsters remember him as

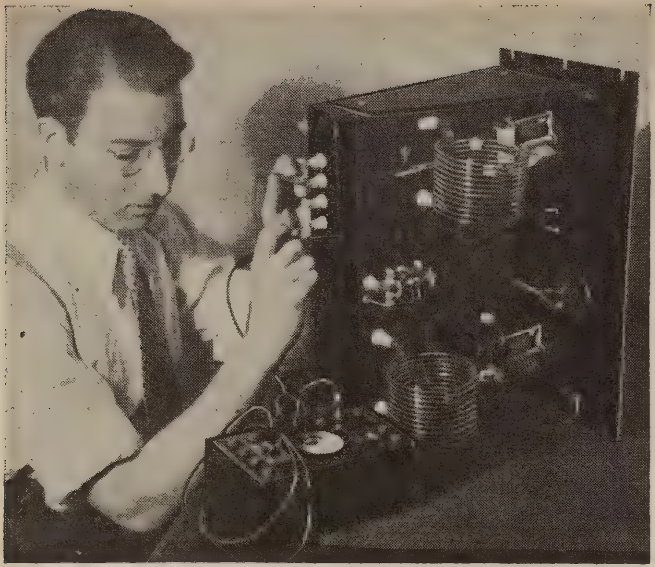
a. A pioneer in the use of ultra-short waves.
b. The first man to radio a call for help from a sinking ship.
c. The first man to respond to a call for help radioed from a sinking ship.
d. The inventor of ship-to-ship radio telephony.

16. The most efficient means of transmitting high frequencies by means of wire lines is

a. Widely separated single wires.
b. Twisted pair.
c. Transposed lines.
d. Co-axial cable.
e. Shielded wire inside grounded shield.

17. If a voltage doubler is used to increase the voltage in a circuit approximately two-fold, a voltage multiplier

(Continued on page 490)



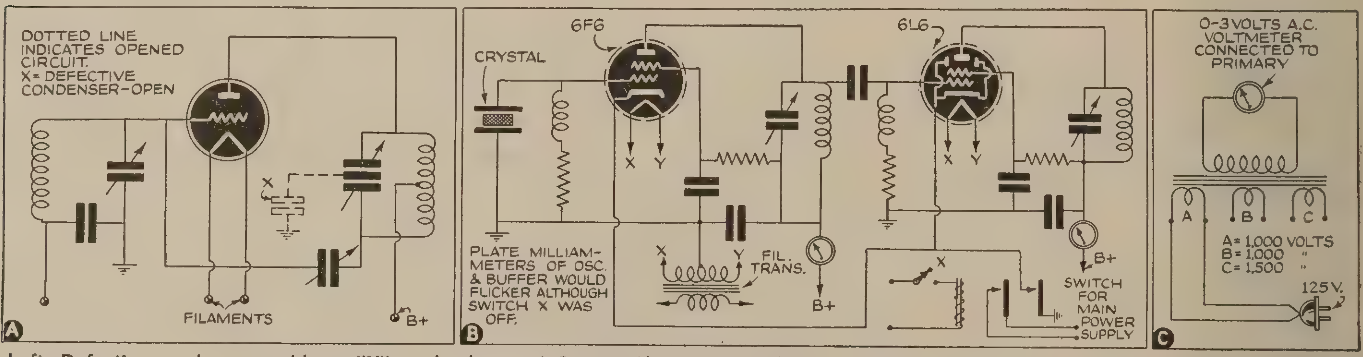
Shooting Trouble on the Ham Transmitter

Alvin Abrams, W2DTT

Several interesting problems met with in operating transmitters are here described.

● IN this article, the author will attempt to describe some puzzling conditions which have been encountered in transmitter servicing and the methods used to locate the source of trouble. These experiences have been garnered for the past six years, during which time the author has worked on nearly every type set familiar to the radio amateur. No effort has been made heretofore to describe these unusual circumstances which occur frequently and because they are so diversified and complex in nature, they stimulate the curiosity and are worthy of printed description.

As we know, all radio hand-books and periodicals describe in great detail prosaic transmitter troubles such as downward modulation, imperfect neutralization, distortion in audio frequency and radio frequency equipment, although it will be admitted that each case presents its own peculiar problems. It is therefore hoped that the following will prove of inestimable value when similar situations are met with. Here is a sample problem which will further clarify the type of situation referred to above.


DOTTED LINE INDICATES OPENED CIRCUIT.
X= DEFECTIVE CONDENSER-OPEN
X
FILAMENTS
B+
A
6F6
CRYSTAL
X
Y
PLATE MILLIAMMETERS OF OSC. & BUFFER WOULD FLICKER ALTHOUGH SWITCH X WAS OFF.
X
Y
FIL. TRANS.
B+
B
6L6
X
Y
X
B+
SWITCH FOR MAIN POWER SUPPLY
0-3 VOLTS A.C. VOLTMETER CONNECTED TO PRIMARY
A
B
C
A= 1,000 VOLTS
B= 1,000 "
C= 1,500 "
125V.
C

Left: Defective condenser problem—"X" marks the spot! Center: Plate meter "flicker" mystery. Right: Test for "short-circuited" secondary; the exciting current is connected to the "secondary" for this test.

Trouble from a Defective Condenser

The circuit involved consisted of a single-ended plate neutralized stage with a balanced tank circuit. The amplifier was neutralized and excitation and plate voltage applied. According to the meters in the circuit, it was functioning satisfactorily, but upon modulation it was found that the antenna current decreased and was therefore not working correctly. The causes for downward modulation were then reviewed and mentally tabulated. The first cause, overloading of the amplifier, was discounted and rejected because the plate current was normal, that is, at its calculated value. The second cause, inaccurate or off resonance tuning of the plate tank condenser, was likewise discarded because the stage was tuned precisely. The third cause, insufficient excitation was considered because it appeared that the grid current was possibly a shade too low.

The first step to a solution was made when the B positive switch to the exciter stage was accidentally disconnected and surprisingly enough did not trip the overload relay in the circuit of the amplifier, as would normally be the case when excitation is removed from an automatically biased stage. With excitation removed, the amplifier plate current did not flicker perceptibly, and in fact, the amplifier was actually working by itself. Immediately, it was thought that the stage was out of neutralization, that is, the tube was returning part of the output power to the input, and hence was in an oscillatory condition.

A neon bulb was therefore coupled to the tank and the B positive switch was shut off but excitation applied. The amplifier tank condenser was rotated throughout the scale but the neon bulb did not light, indicating that the stage was apparently neutralized properly. As a further test, the neutralizing condenser was shifted to a random position and the amplifier condenser once again rotated until the bulb lit. The neutralizing condenser was then adjusted until the bulb went out. The setting of the condenser was identical to the previous setting.

The plate power was reapplied but still, upon modulation, the antenna current would decrease approximately 5 per cent, and again when excitation was removed the amplifier would continue to oscillate. This was extremely puzzling and annoying.

Connections to all tuned circuits were checked and found to be in good condition, leaving only one possibility untried, that of a *defective* part.

It was thought that the trouble was originating from some portion of the tuning or neutralizing circuits. An ohmmeter was used to check all condensers and showed that they were in good condition, i. e. *not* shorted. A 250 volt source was then used to determine whether possibly one of the condensers was open. All checked *good* with the exception of *one!* This was a .002 microfarad condenser used to isolate the rotor of the amplifier plate tank condenser from ground which was put in to remove the *direct current* potential between rotor and stator. It was temporarily shorted out and the stage then worked to complete satisfaction.

(Continued on page 495)

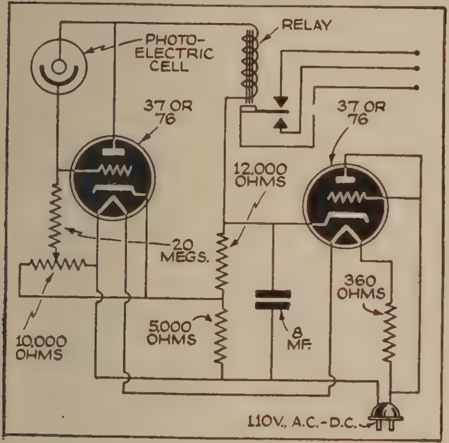
New Experiments with Radio Apparatus

Each month we will award 2 prizes, ——the first, 2 years' subscription; the second, 1 year's subscription—— for the best non-radio uses of ordinary radio parts and radio instrumentalities.

Photo-cell Relay

1st Prize—2 Years' Subscription

● A very sensitive photo-cell light relay is shown in the sketch. Distances up to 150 feet have been covered with it.



Simple Photo-cell and Relay Set-up.

The cell can be almost any photo-emissive type. The relay should be capable of operating on a variation of 1 mil. Pure D.C. is not necessary, so the 8 mf. condenser suffices for the filter system. The 20 megohm resistor is very important; any substitution (unless it is of a higher value) will result in a decrease of sensitivity. A 360 ohm resistor in the power cord provides the necessary voltage drop for the filaments.

To put the unit into operation, the potentiometer is adjusted so that, with the light source focused on the cell, the relay is just barely closed. Then when the beam is interrupted, the relay will open. For invisible beams, a piece of red cellophane can be placed over the light source. This reduces the maximum distance of operation to about ten feet.

The light source used by the author is a 21 candle-power, 6 volt auto headlight bulb, mounted in an old box camera with a small transformer and a one-inch lens.—Bill Jakes, Jr.

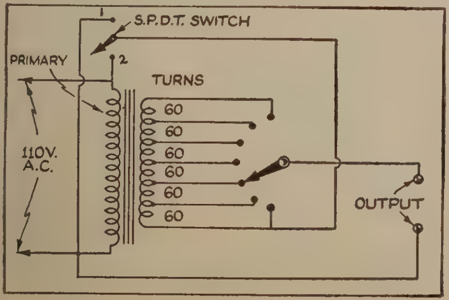
Line Voltage Booster

2nd Prize—1 Year's Subscription

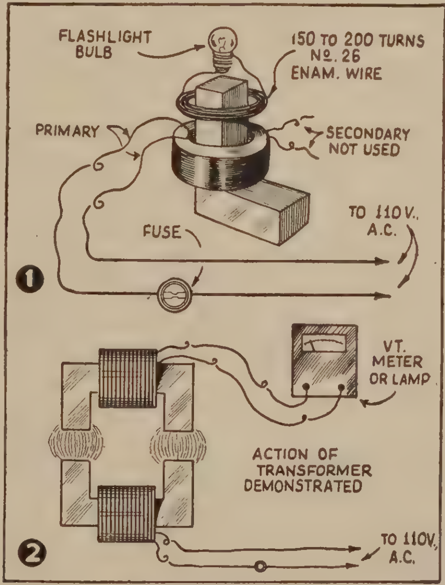
● HERE'S a new use for an old power transformer, if the primary is still in good condition, which is usually the case. Take all the windings off down to the primary coil, which is usually on the bottom. Then wind on about 360 turns of No. 22 wire, or larger, if there is enough space in the core opening, and bring out a tap at every 60 turns. It is then connected as shown in the accompanying sketch to a switch and any suitable regulator.

With the SPDT switch in the low position, a range of from 0 to 90 volts may be had. With the switch in the high position, a range of from 110 to 200 volts may be had and both ranges are in 15 volt steps with only 7 contacts on the regulator. These voltages will vary slightly if a transformer having a primary consisting of other than a 4 to 1 turns to volt ratio is used. If the high range decreases the voltage instead of increasing it, connect the primary to the other end of secondary, thus reversing the connection.

I have found this transformer particularly useful in varying the speed of small fans, boosting the line voltage, and testing and experimenting in general around the shop. The transformer, regulator and switch may all be assembled in any suitable container for convenience.—Clarence H. Cramer.



Transformer rig to boost line voltage.

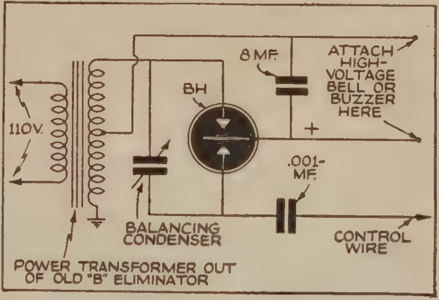


Old audio or other transformers prove useful for "induction" demonstrations at clubs, etc.

Demonstration of Transformer Action

● I SUBMIT the following device for your contest. It is part of the iron core of an old Audio Transformer with its windings. By putting 110 volts through the primary section of the coil, a current is set up around the core. Place a coil of 150 to 200 turns of No. 26 enameled wire, with a flashlight bulb attached to each end of the coil, over it. Current will then be induced in the small coil of wire, and there will be enough to light the bulb. The small coil of wire may be slowly drawn away, and the light will grow dim.

This experiment demonstrates the action of a simple step-down transformer.—John E. Hurley.


8 MF.
ATTACH HIGH-VOLTAGE BELL OR BUZZER HERE
BH
110V.
+
.001-MF.
BALANCING CONDENSER
CONTROL WIRE
POWER TRANSFORMER OUT OF OLD "B" ELIMINATOR

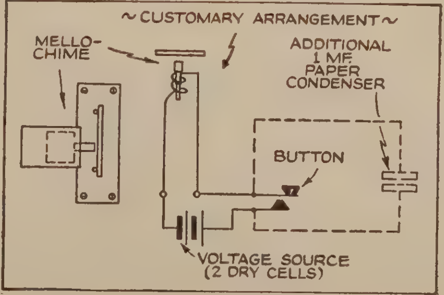
Touching the control wire actuates the alarm.

Burglar Alarm

● THE accompanying diagram shows a simple yet effective burglar or thief alarm. This hookup makes use of one of the BH rectifier tubes. The alarm is set off by touching the control wire, as shown in the diagram; this has the effect of increasing the capacity on that side of the circuit. Practically the only current consumed by the device is the slight loss in the transformer core and windings. A relay may be used with this circuit, if desired.—W. L. Reemes.

Two-timing a Chime!

● A "MELLO-CHIME"—a musical doorbell which chimes only once when you press a button, can be made to chime twice—once when the contact is made and again when it is broken. The current flows into the chime's coil at the moment the button completes the circuit; the radio condenser receives its current charge by surge action as the field about the chime coil collapses and the magnet discharges its stored energy into the condenser, when the button is opening the circuit. The condenser then discharges its energy back to the coil, where it is spent in a final effort to pull the chime pole against the musical bar or plate.—Willard Moody.


~CUSTOMARY ARRANGEMENT~
MELLO-CHIME
ADDITIONAL 1 MF. PAPER CONDENSER
BUTTON
VOLTAGE SOURCE (2 DRY CELLS)

Adding a condenser gives chime 2 tones.

The Short Wave League

HONORARY MEMBERS

Dr. Lee de Forest
D. E. Replogle
John L. Reinartz
Manfred von Ardenne
E. T. Somerset
Hollis Baird

Hugo Gernsback, Executive Secretary

On the Ham Bands

(with the "Listening Post" Observers)

Edited by Elmer R. Fuller

● AS soon as it can be compiled, a list of the stations which are known *not* to verify reports will be published. If you know of any such, please send me their calls.

Once more, I must ask you to report only good DX according to the standard which was outlined in the October issue. Thus far, fifty-seven observers have been appointed throughout the entire world. Every continent except Australia and South America is represented. Our farthest observer from this location (Cortland, New York) is Masud Akhtar of New Delhi, India. Mr. Akhtar read this department in the September issue of RADIO & TELEVISION.

Recognize your favorite magazine in the hand of John Versfeld of Klaasenbosch, Cape Town, P. O. Constantia, South Africa? He has logged 350 S.W. and B.C. stations, and more than 400 Hams in 53 countries.

First this month we will hear from A. R. Rowley, observer for the Republic of Panama. Mr. Rowley has just received permission from the government of Panama to own and operate an amateur c.w. station on the 20- and 40-meter bands. And now, here is his report:

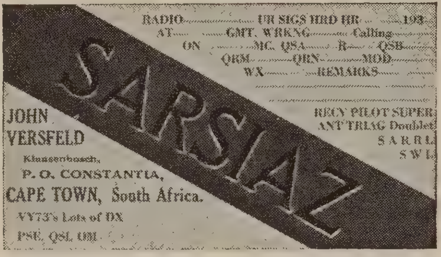
Call	Freq.	R	S	Call	Freq.	R	S
W6PER	14.20	5	9	J5AH	14.33	4	6
W6NIX	14.25	5	7	ZL2BE	14.05	5	6
VK2NQ	14.35	5	6	W7BJS	14.35	5	7
EA9AH	13.99	4	5	VP7NH	14.15	5	9
G2PU	14.09	5	7				

William Dean Noyes—Observer for Nebraska

Call	Freq.	R	S	Call	Freq.	R	S
VK2ABD	14.12	5	9	VK3XP	14.10	5	8
VK2ADT	14.06	5	8	VK3ZX	14.02	5	9
VK2AJU	14.11	5	8	VK4JP	14.05	5	9
VK2EH	14.10	5	9	VK4JU	14.15	4	6
VK2HX	14.11	5	8	YV1AQ	14.00	5	9
VK2JN	14.33	3	5	YV4AE	14.08	5	9
VK2UC	14.10	5	9	YV5ABQ	14.06	5	8
VK3AZ	14.12	5	9	K4EJF	14.24	4	8
VK3BZ	14.15	5	9	K4FAY	14.21	5	9
VK3ED	14.11	5	7	K6ILW	14.21	5	8
VK3ES	14.10	5	7	K6OJI	14.17	5	9
VK3PB	14.05	5	7	K6OQW	14.23	5	8
VK3OR	14.14	5	8				

Len Carling—Observer for Illinois

Call	Freq.	R	S	Call	Freq.	R	S
VK3EH	14.060	4	7	VK4HN	14.295	3	4
VP3AA	14.085	5	8	VP7NU	14.045	5	9
VK2OG	14.100	4	6	VP7NS	14.100	5	8
CN1AF	14.275	4	7	K6FKN	14.234	5	8
PA0WN	14.265	3	5	K6ILW	14.198	5	8
K5AH	14.260	5	7	VP7NC	14.252	5	8



RADIO .... UR SIGS HRD HR 193
AT .... GMT. WRKNG .... Calling
ON .... MC. QSA .... R .... QSB
QRM .... QRN .... MOD
WX .... REMARKS

SARSIAZ

JOHN
VERSFELD
Klaasenbosch,
P. O. CONSTANTIA,
CAPE TOWN, South Africa.
VY73's Lots of DX
PSE. QSL OM.

RECV PILOT SUPER
ANT TRIAG Doublet
S A R R L
S W L

If you ever contact Mr. Versfeld, you'll get one of these for your collection.

The QRA of VP7NC is P. O. Box 703, Nassau, Bahamas. CN1AF is at Tangier, International Zone, North Africa. The exact QRA is not known here, but an attempt will be made by yours truly to find it, and report it as early as possible.

Ernest W. Lang—Observer for Washington

Call	Freq.	R	S	Call	Freq.	R	S
KA1BH	14.110	5	6	KA1CS	14.310	5	5
KA7EF	14.140	5	8	KA1JM	14.260	5	7
KA1HS	14.280	5	6	KA1FT	14.100	5	6

Howard Kemp—Observer for Connecticut

Call	Freq.	R	S	Call	Freq.	R	S
VP6FO	14.08	5	8	VK3WA	14.277	5	6
VP5IS	14.08	5	8	VK3HG	14.035	5	5
K4FCG	14.18	5	8	VK2LC	14.05	5	4
VP3AA	14.075	5	7	K6KMB	14.21	5	7
K5AH	14.234	5	7	K6AIU	14.188	5	5
NY2AE	14.190	5	7	VR6AY	14.346	5	7
VP1BA	14.13	5	7	PK6XX	14.01	5	5
SV1KE	14.025	5	7	VK2MH	14.127	5	5
ON4AM	14.120	5	6	VK2ABK	14.087	5	6
CT1OO	14.143	5	6	VK5KF	14.115	5	6
SU1KG	14.04	5	6	VK4JT	14.035	5	6
CN8NA	14.10	5	6	K4EZR	28.—	5	8
CN8MA	14.09	5	6				

Charles H. Fuller—Observer for your editor

Call	Freq.	R	S	Call	Freq.	R	S
VK3BZ	14.150	4	6	G3FA	14.125	5	6
VP7NS	14.175	5	8	G6GF	14.200	5	7
G5ML	14.175	5	7	CX2AK	14.090	5	7
G2AI	14.175	5	6	G5QN	14.150	4	7
GM8RJ	14.175	5	6	G6JL	14.300	5	6
G6AG	14.180	4	6	VP7NU	14.100	5	6
EI8J	14.200	5	7	G2TR	14.150	4	6
G8LP	14.200	5	6				

Clarence Hartzell—Observer for Pennsylvania

Call	Freq.	R	S	Call	Freq.	R	S
VP1BA	14.112	5	8	TI3AD	28.290	5	6
YN1OP	14.307	5	8	HI7G	28.310	5	8
VR6AY	14.346	5	8	G6DT	28.200	2	3
PK6XX	14.000	4	7	G8M?	28.426	3	3
NY2AE	14.210	4	6	G2KU	28.590	3	4
VP6FO	14.091	5	7	G6BH	28.230	4	4
VK2UC	14.090	5	9	G2MI	28.270	5	6
VK3PE	14.030	5	7	G8TD	28.340	3	4
VK2HF	14.270	4	8	G5BM	28.348	2	4
VK4VD	14.146	5	9	GM6RG	28.430	5	8
K7AFC	14.165	5	8	F8UE	28.390	4	4
SU1CN	14.300	3	7	EI2L	28.290	3	5

According to information received from Observer Hartzell, either United States or New Zealand stamps may be used for return postage from VR6AY. The QRA is Amateur Radio Station VR6AY, c/o Andrew C. Young, Pitcairn Island.

L. F. Gallagher—Observer for New York

Call	Freq.	R	S	Call	Freq.	R	S
VK3ED	14.300	3	5	G8UY	14.020	4	8
VK4VD	14.310	4	6	G6NI	14.100	5	7
VK2QR	14.290	2	4	G2UF	14.150	3	7
VK4JU	14.350	4	8	G5NI	14.110	5	8
VK2AIZ	14.270	3	8	VP3AA	14.350	5	7
VK2QI	14.300	3	4	VP7NS	14.030	5	9
VK3EK	14.270	5	4	VP5IS	14.310	4	8
VK3UC	14.310	4	9	VP6FO	14.300	5	7
VK2ADD	14.300	3	6	PK2AY	14.300	4	7
VK2AGT	14.320	4	6	CN1AF	14.300	5	9
G5MF	14.000	5	7	CT1QA	14.300	5	8

Tom Jordan—Observer for Pennsylvania

Call	Freq.	R	S	Call	Freq.	R	S
EA9AH	13.992	5	9	Rdo Malaga	14.440	5	8
VO1I	14.225	5	9				
K5AH	14.200	5	6				

John Fitzpatrick—Observer for New Jersey

Call	Freq.	R	S	Call	Freq.	R	S
VR6AY	14.340	4	9	GM6RG	28.210	4	7
VK2OH	14.110	4	6	K4FKC	28.200	5	8
PK6XX	14.350	3	4	K4EZL	28.210	5	8
VK4VB	14.135	4	6	G5BM	28.205	3	6
HR5C	14.240	5	9	EI2L	28.200	4	7
VK2OJ	14.030	4	4	W7GGG	28.225	5	9
VK4JC	14.010	4	6				
CN8MV	14.050	5	7				

C. R. "Pat" Patterson—Observer for Georgia

Call	Freq.	R	S
VP7NS	14.05	5	9

Elvyn L. Barker—Observer for Maine

Call	Freq.	R	S	Call	Freq.	R	S
VP7NS	14.15	5	9	VR6AY	14.35	4	5
CX2AU	14.13	4	5	PK6XX	14.20	5	7
VP6LN	14.04	4	7	CN1AF	14.23	4	6
VP1BA	14.19	5	7	PA0MZ	14.10	5	7

Burns E. Hegler—Observer for Kansas

Call	Freq.	R	S	Call	Freq.	R	S
YN3DG	14.26	5	7	VK3HG	14.—	5	8
PK6XX	14.02	5	8	TG5	14.—	5	9
VP6LN	14.01	–	–	NY2AE	14.—	5	8

(*Continued on page* 488)

Here's B. Takars of Kispest, Hungary. His call is now HA5C.

Local HAM Gossip

Brunswick, Ga.

● THE Hams of Brunswick and Saint Simons Island, Georgia, have formed a club which will further the activities of all who are members and those who join later. The primary cause of the formation of the club was their interest in their community in case of an emergency.

The amateurs formed a governing board, electing a president, secretary-treasurer and vice-president. In ten weeks the club grew to a membership of over twenty-five, including hams who operate the twelve or fourteen stations located in this area.

There are two radio engineers included in the membership, Communications Engineer H. T. Adams and Radio Engineer Morgan, along with a ham of long standing, A. R. Bates, manager of the local Western Union, who is president of the organization.

The members of the club have attended regularly-spaced code schools, where the beginners have learned the fundamentals of code and another where the more-advanced code-students have had an opportunity to improve their speed.

Application has been made for a charter in the Amateur Radio Relay League, and favorable action is anticipated by the members of The Brunswick Amateur Radio Club on this matter.

They plan to build a club-house transmitter in the near future where the touring hams can visit with the members of the local club—*J. E. Joines, P. O. Box 172, Brunswick, Georgia.*

Amateurs Active during Boston Hurricane

● BOSTON hams had a busy time of it during and after the semi-tropical hurricane.

At 6:20 p.m. the electric power at W1AFP, of Hyde Park, went off. One of the first hams to have electric service restored, 1AFP had his power line repaired by 2:00 p.m. on the 22nd.

W1AFP regularly operates on 5 meters, but none of the "local" boys seemed to have their power as yet. So, a hastily built-up 210 Hartley oscillator was put on 40 meters. Not much traffic was handled, however, since few stricken areas had electric power. Relaying was difficult because of *skip*, and also because power lines were down all over New England.

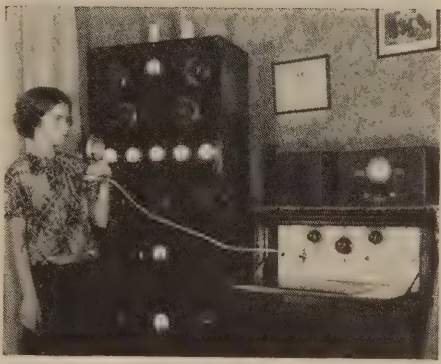
However, when the electric service was restored at W1PI, and at Hyde Park, late in the afternoon of the third day, real action began. 1AFP went over to 1PI's shack to help handle traffic that had been pouring in for two days. Operation was carried on 5, 80 and 160 meter phone and c.w. An emergency net was formed with W1SS, W1KYJ and W5CSU. Traffic was relayed on 5 meters to W5CSU who sent it on over 80 meter c.w. at the key of W1MX, at the Mass. Institute of Technology. In addition, W1KRL handled traffic for points south and west on 160 meter phone. Other cooperating hams, included among whom were W1HLW, W1JPX, W1AGR and W1JSV, kept their local channels clear for messages intended for their areas.

Operating portable mobile were W1JDO, W1JLI and W1FTR, on visit from Hartford, Conn., who picked up plenty of local 5 meter traffic and actually delivered the messages, driving right up to the doors! Many other hams, not mentioned above, also rendered valuable assistance.

The Boston Police Department telephoned many messages to W1PI, for retransmission, since telephone lines outside the city were down. In fact, 1PI had police department messages waiting for transmission before his electric power was restored. Most of the police department messages were of a personal nature, as Boston residents phoned the police, asking them to forward messages to relatives or friends in stricken areas. The police then relayed to W1PI.

A vote of thanks is due to Mrs. W1PI, who hour after hour fed the boys with hot coffee, cake, pie and sandwiches. And all that helped them to carry on from 5:00 p.m. Friday until Monday at 2:00 a.m. with only 8 hours of sleep in the whole 57 hour stretch.

It is conservatively estimated that 2000 messages were handled. After that, with every message cleared out, they called it a "night," and hit the hay at 3:00 A.M.—*J. A. Schindler,* W1IZH.



This YL is 14-year-old Betty McConnell, daughter of Roy E. McConnell, Chief Radio Engineer of Police Radio Station W9XEH, Evansville, Ind. The station is her OM's ham rig, W9HBS, using a 6L6G oscillator, an 807 doubler, a T55 buffer and a pair of T55's running 350 watts in the final. Speech equipment includes a crystal mike into a 57, resistance-coupled into a 56, transformer-coupled to a pair of 56's, into a 500-ohm line to a pair of 2A3's and a pair of 830B's as modulators. It works all bands on phone or c.w. In the floods last year it was on the air for 408 hours without signing off, and was given a special frequency and the National Guard call letters LC9E.

2½ and 5 Meter Bands Active
W2JZO

● TRAMPING up to the North Pole would probably have been an easier task than to get a completed QSO from the Metropolitan area this summer. QRM and more QRM seems to be the rule.

Apart from this, however, some interesting things are taking place. W2AU, with a close-spaced home-made beam antenna and 300 watts, seems to be taking all the laurels away from the "Kilowatt boys" when it comes to putting signals into the ether. WAC (worked all continents) within twenty-four hours after the beam went up. Elmhurst must be a Ham's paradise as W2IHX worked more than one hundred Europeans within three weeks after he moved out there! W2GRG has passed the century mark when it comes to working countries, with W2IKV a close runner-up with 77 and still going strong. W2JEH must have a warm spot in his heart for the sunny South.

W2JIL, from the wilds of Brooklyn, seems to have the technique when it comes to the making of contacts. He gets what he is after. W2BWE believes in building his own HRO receivers. Says that they pull in more DX. It must be in the way that he *polishes his tubes!* W2KBG made quite a record for herself on five the past summer. "DX or nothing," so Sally says, and DX it was!

The five meter band is becoming almost as crowded as the twenty meter band and not with flea-power transmitters either. Kilowatt jobs are not uncommon, with 200 to 300 watt transmitters taking the lead. This may seem funny to some of you but one of our local hams with 0.1 (1/10) watt into the antenna has been working some real DX on five meters!

Two and one-half meters seems to be almost as active as five meters, and I believe it is a better band for short distances. Less QRM and more DX. You will need a 2½ meter antenna for "rubbering in" on that band if you are expecting to give it the once-over. Don't pass it up if you have a receiver that will go *down* that far.

The "73 Club" here in the Metropolitan District is doing a fine piece of work. When it comes to interesting meetings, they have them—discussions and lectures by men who know their subjects. They give the Ham what will help him most; they also help him with his individual problems. Something interesting for hams at every meeting is their aim. We are wondering what has happened to the Hudson Division Radio Phone Association. Did it get lost in the local QRM? Ken Hill gave us some very fine meetings last Winter and Spring. You know him as he is our ARRL Director, and is doing his best for us.—*Albert C. Uthe,* W2JZO.

New! Exclusive!

Roster of

New HAMS

See Page 493

Rocky Mountain Division News

● THE 12th ARRL Rocky Mountain Division convention has come to an end and through the assistance given by RADIO & TELEVISION to make this convention a success, "ham" radio has again gone a step forward.

No expense was spared to give every one attending his money's worth and yet not place the burden of such expense upon those who had no particular interest in such a gathering. Only through your whole-hearted co-operation was this possible. The attendance at the convention speaks for itself, in the amount of interest created, by the fact that the paid registrations exceeded those of any Rocky Mountain Division convention held during the past few years.—*San Isabel Amateur Radio Ass'n, E. S. Buchanan, Activities Mgr.*

Buffalo News

● DURING the fall and winter season, several local organizations will offer instruction in amateur radio; continental code and general radio theory. The first unit to announce schedules for this instruction is the radio division of the local Boy Scouts.

A six-month radio course is being offered at the Sea Scout base at the foot of Porter Avenue. This instruction is for scouts interested in radio and includes continental code as well as practical and theoretical radio.

Jack Vom Scheidt, skipper of the local radio division, will serve as instructor. Further details are available at Boy Scout Headquarters, 110 Franklin St.

The question "How short is a short wave?" has for years challenged amateurs to investigate the possibilities of these ultra short wave transmissions. During the coming tests, another step is being taken to check the behavior of the extreme short waves. A one quarter meter transmitter is to be operated and an attempt made to send a signal from Colden to Buffalo. This is the first time that any one quarter meter transmissions have been radiated during the high frequency field tests.

Experimenters in Buffalo are asking to report upon results to Leon Ryker of 228 Jewett Ave. Canadian amateurs should report to Harry Lang of 33 Lessard Ave., Toronto, and amateurs in remote New York, Pennsylvania and Ohio areas should report to Robert T. Schlaudecker of 2424 Taggert St., Wesleyville, Pa.—*Conrad J. Klauk, 418 Perry St., Buffalo, N. Y.*

"Hudson Division" News
W2IKV

● THE summer months saw a great deal of rebuilding, and also many new antenna structures. Several rotating arrays are now in operation, with their users quite gratified at the results obtained. Rumor has it that one of our better known 5-meter stations is planning an elaborate rotating beam array for use with the new 300 watt transmitter he is building for the 56 mc. band. The past summer saw considerable portable mobile and mobile marine 5-meter work. In fact, one station was so scared at working a 56 mc. marine station that he, the land station, believed it was the F.C.C. finally catching on to him, for sure. (Wonder why he had a guilty conscience?) The bootleggers continue to flourish, and it is too bad that the amateur bands, already so crowded, cannot be rid of this nuisance.

To those of you who are really interested in your hobby let me repeat, now is the time to devote some serious thought to the problems confronting *amateur radio.* For your own good, as well as that of your fellow amateur, do something constructive, in the form of electing a *suitable director,* who will represent you and your club and your division. Join the League, become affiliated with your *local club,* and make this one of radio's most memorable seasons for yourself and fellow hams. 73 es BCNU.—*Llewellyn Bates Keim,* W2IKV.

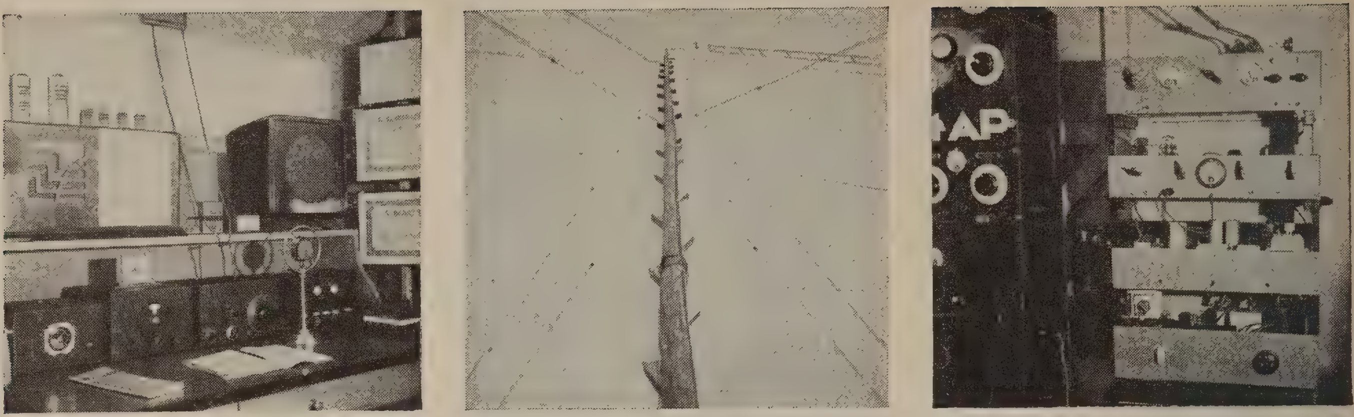
South Bend, Indiana, Activities

● THE South Bend Amateur Communications Society president is Herb Cole, Chief Engineer of Tribune Stations WSBT-WEAM. He obtained our present clubrooms for us, with facilities for 200 or more. Plans are being made to form a club-network with a key station to take care of cross-communication and to maintain regular schedules. The club's Vice-President is Francis Bock, Chief Operator of the local police station, WPGN. Don Vary, W9ZTG, is our publicity man. He writes a weekly column called "CQ" in the Tribune. W9KOE, Irwin Hoffer is Treasurer. W9PDS, is the Secretary.

W8QJN, a WAS-WAC man, has moved back to his place in Mishawaka, Ind., where he has

(Continued on page 483)

What Do YOU Think?



Photos above show the high-quality transmitting and receiving equipment and the antenna mast at station ON4AP, owned and operated by Rob. Godefroid, 23 Rue Basse, Audenarde, Belgium. Mr. Godefroid is particularly interested in 5-meter work and he has special antennas for use on this band. He uses a "one to ten" meter National receiver. One of the receivers used is a Super Sky-Rider. The transmitter panel construction will provide some new ideas for American Hams. The station transmits on 80, 40, 20, 10 and 5 meters.

Wants 3- to 6-Tube Receiver Data

Editor,

When I last heard about the old "ogre of the ham bands," he was going to gobble up a few smart young "squirts." His hallucination was truly remarkable for a man of his mental capacity. He must have had considerable experience with the bootlegging racket as he seems to know all about it. I'll bet that no one ever gave him any R-9 reports!

QSLing is a great sport. It stimulates the growth of "hamdom" and makes people more interested in S-W operations. The hams have contributed much to radio by continuous experimenting and yet Mr. Fiege condemns them.

Now for some brickbats. Whoin'ell builds nine to twelve tube superhets? Not many fans who want real DX build one and two tubers. This magazine is supposed to be for the advanced fan as well as the beginner. I think that three- to six-tube receivers and medium-power transmitters are more appreciated.

Live up to your motto of having the radio experimenters' magazine. Print *more* constructive articles. Tell those, who don't know, how they may become amateurs and how to learn the code.

Now for some bouquets. There are several good columns but the S-W kink and the Joe Miller departments are about tops. Many times I have referred to the *kinks* printed in your magazine for aid in solving S-W problems.

Wishing you 73 and hoping that more good work is begun.

John Geary,
R.F.D. 6, Box 719,
Phoenix (the land of the SUN),
ARIZONA.

New South African Calls

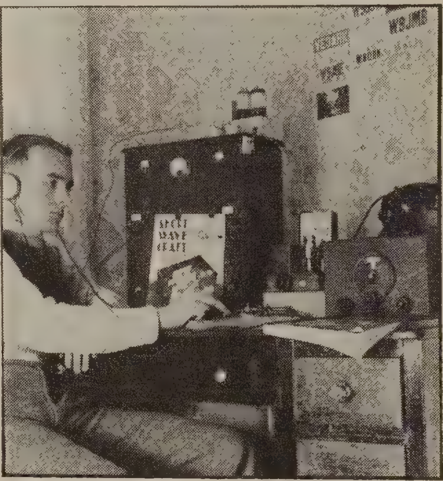
Editor,

When you tune in on 20 or 40 meters DX and happen to hear an amateur with a new call sign—inter alia—South Africa, do not think you have logged someone new, no, not in the least; it is only an old one which you perhaps have already in your log book. The following letters have been allotted to the Union of South Africa, viz: ZS; ZT; ZU with Divisional numbers and individual letters.

The prefix Call letters ZT and ZU will no longer be used by South African amateurs, and a general revision of Amateur Call Letters in South Africa has taken place, and new call letters allotted; e.g.: "Z U 1 V—Mr. G. H. J. Sadler of 'Culham,' Tiverton Road, Plumstead, South Africa, has now been allotted new call letters viz: Z S 1 (one) C O" (ZS1CO).

W. T. D. Murray,
% S. A. Police,
DEEP RIVER, via Cape Town,
South Africa,

W8QKA Ham Station at Parma, Ohio



The photo above shows the Ham station of Joseph Horvath, W8QKA, 3710 Wellington Ave., Parma, Ohio. Receiver used is a National AC-58 and the power supply unit is home-built. The transmitter at the left of the desk is a 6L6M crystal tritet with a 10 final amplifier. The frequencies used are 3633 and 7266 kc.

An English "Ham," Harry Tee, G8UA.

An English "Ham" Greets Us

I have been a reader of S.W.&T. since 1934, and have hardly missed a month since. I think your magazine is about the best all-round one available—it has something for everybody—Ham, S.W.L. and Experimenter.

Last year I received my amateur license and am now active on the ham bands.

The transmitter here is a CO-FD-PA, using American tubes, 47 crystal oscillator, '10 doubler, and a 801 in the power amplifier, running 10 watts input. This is on 40 meters. For 20 meters I use a single '10 tube in a Hartley circuit, with about 7 watts input, and this has worked fine for DX, considering the low power. Up to the present I have worked 38 countries in 3 continents (Europe, Africa, and North America), DX includes W-1-2-3-4-8, VE1, SU, U-1-2-3-4-5-6, CT2, FA, CN, etc.

I like Joe Miller's department very much and always enjoy reading it. Keep up the good work, Joe! I would like to see a short article each month dealing with C. W. DX heard and worked on the amateur bands, so what say? (See "On the Ham Bands" in the S-W League Department.—*Editor*)

In closing my letter I will say how much R.&T. has helped me in the past, especially when studying for my amateur license, 73.

Harry Tee,
(Amateur Radio Station G8UA.)
104 Rectory Road,
BURNLEY,
Lancs., ENGLAND.

Thanks for the Suggestions

Editor,

I have been interested in short wave radio for some time and at present have a 5-tube home-built set, on which I have heard stations in over thirty countries.

Joe Miller's department is very fine. The station list should not be spread through the magazine, as this is highly inconvenient; the *Question Box* should be given at least two pages. I prefer articles on small experimental sets.

I believe the collecting of QSL cards can be as interesting a hobby as radio itself. My friends and I would like to see more letters of the type that Mr. Fiege wrote. His "clowning" and the subsequent answer of his many "admirers" gave us all a big laugh. It is he who should dig a hole and crawl into it—that is, if he is able to. Hi!

H. G. Dinacker,
Reading, Pa.

This beautiful silver trophy stands 11¾" high and is to be awarded monthly by RADIO & TELEVISION magazine for the best photo of a Ham station. The silver statue stands on a handsome bakelite base on which is a silver plate. The name of the winner will be engraved on this plate before the trophy is sent to him.

SIXTH

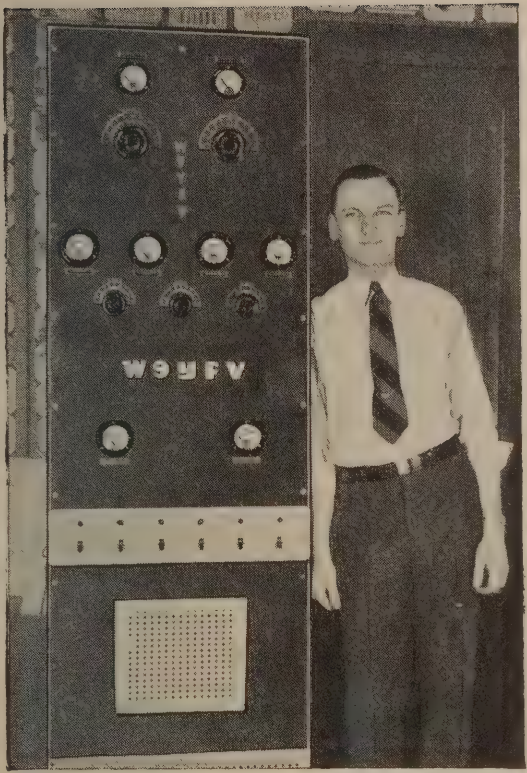
Silver Trophy

Awarded to

Edward G. Schmeichel

W9YFV

Chicago, Ill.



Here's the rig that reached 265 hams in 40 countries, within 60 days. The man who built and works it stands beside it.

● THE transmitter built by Edward Schmeichel at W9YFV is a home-made job but is comparable in appearance and performance to commercial apparatus. "The line-up," says Eddie, "is an RK49 tritet (using six variable gap crystals), 807 buffer doubler, a T55 buffer link coupled to a Taylor T155 in final, running 600 watts input on all bands from 10 to 160 meters." Frequently Mr. Schmeichel works on phone; the speech equipment used includes a Turner cell type crystal mike, a 6C6 pentode, 76 second speech, 76's push-pull, and 6A3 drivers coupled through a 500 ohm line to four TZ20's in push-pull parallel. The final stage normally runs at 3000 volts on c.w. and 200 volts on phone. The output is fed into a 99-foot end fed Hertz antenna which is 75 feet above ground. One interesting feature of the setup is the use of a D.P.D.T. relay to switch the antenna from the transmitter to the receiver. The transmitter readily uses break-in and push-to-talk, and is entirely controlled by relays from the operating position.

The receiver is an RME69 with a built-in noise-silencer and a DB20 pre-selector.

Eddie Schmeichel, of the Windy City, wins the Silver Trophy this month for the best Ham Station photos. Have *you* entered a photo of your rig yet?

The transmitter was completed in time for the last DX contest, and in the sixty days between March 5th and May 3rd, 1938, young Mr. Schmeichel made 265 DX contacts in 40 countries, scattered over every continent on the face of the earth. According to reports received from all over the world, W9YFV has beautiful quality on phone, and its note on c.w. is considered by fellow Hams as "a distinct pleasure to listen to."

Mr. Schmeichel adds "I have been a consistent booster of Short Wave Craft (the former name of Radio & Television) and owe my start in short waves to this magazine. Vy 73 de W9YFV."

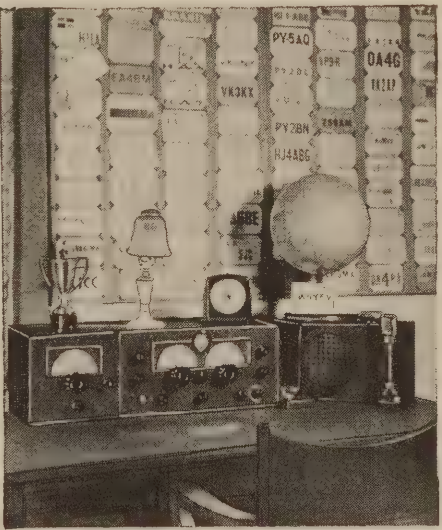
(Mr. Schmeichel's address is 2968 S. Loomis St., Chicago, Ill.)

Rules for Trophy Contestants

● WOULD you like to win one of these beautiful silver trophies? It is very easy to do so—simply send the Editors, a good, clear photograph of your Ham station. If your station photo is selected as the best of those submitted each month, you will be awarded one of these handsome silver trophies with your name engraved on it.

The trophy stands nearly 12" high and is a fine example of the silversmith's art. We are sure that every Ham in the country will be tickled with it, if he should win it. The silver trophy represents the spirit of victory and it was designed by one of the leading silversmiths. The name of the winner each month will be engraved on a silver plate mounted on the black bakelite pedestal before the trophy is sent to the successful contestant.

The next award will be announced in the February issue, and the closing date for that contest is December 10. The judges of the contest will be the Editors of Radio & Television. In the event of a tie, duplicate prizes shall be awarded to the contestants so tying. For further details see page 315, September issue.



The other half of the winning station—here's the receiver that picked up all that "round-the-world" DX for Eddie.

World Short Wave Stations

Revised Monthly

Complete List of SW
Broadcast Stations

Reports on station changes are appreciated.

Mc.	Call	
31.600	W1XKA	**BOSTON, MASS.,** 9.494 m., Addr. Westinghouse Co. Daily 6 am.-1 am., Sun. 8 am.-1 am. Relays WBZ.
31.600	W1XKB	**SPRINGFIELD, MASS.,** 9.494 m., Addr. Westinghouse Co. Daily 6 am.-1 am., Sun. 8 am.-1 am. Relays WBZ.
31.600	W3XEY	**BALTIMORE, MD.,** 9.494 m., Relays WFBR 4 pm-12 m.
31.600	W2XDV	**NEW YORK CITY,** 9.494 m., Addr. Col. Broad. System, 485 Madison Ave. Daily 6-11 pm.; Sat. and Sun. 1:30-6, 7-10 pm.
31.600	W9XHW	**MINNEAPOLIS, MINN.,** 9.494 m. Relays WCCO 9 am.-12 m.
31.600	W3XKA	**PHILADELPHIA, PA.,** 9.494 m., Addr. NBC. Relays KYW 9 am.-10 pm.
31.600	W5XAU	**OKLAHOMA CITY,** 9.494 m., Sun 12 n-1 pm., 6-7 pm. Irregular other times.
31.600	W4XCA	**MEMPHIS, TENN.,** 9.494 m. Addr. Memphis Commercial Appeal. Relays WMC.
31.600	W8XAI	**ROCHESTER, N. Y.,** 9.494 m., Addr. Stromberg Carlson Co. Relays WHAM 7.30-12.05 am.
31.600	W8XWJ	**DETROIT, MICH.,** 9.494 m., Addr. Evening News Ass'n. Relays WWJ 6-12.30 am., Sun. 8 am-12 m.
31.600	W9XPD	**ST. LOUIS, MO.,** 9.494 m., Addr. Pulitzer Pub. Co. Relays KSD.
26.450	W9XA	**KANSAS CITY, MO.,** 11.33 m., Addr. Commercial Radio Eqpt. Co. Testing
26.400	W9XAZ	**MILWAUKEE, WIS.,** 11.36 m., Addr. The Journal Co. Relays WTMJ from 1 pm.
26.300	W2XJI	**NEW YORK, N. Y.,** 11.4 m., Addr. Bamberger Broad. Service, 1440 Broadway. Relays WOR 8 am.-1 am. Irregular.
26.100	W9XJL	**SUPERIOR, WIS.,** 11.49 m. Relays WEBC daily.
26.050	W9XTC	**MINNEAPOLIS, MINN.,** 11.51 m. Relays WCTN 9 am.-1 pm., 7 pm.-12 m.
25.950	W6XKG	**LOS ANGELES, CAL.,** 11.56 m., Addr. B. S. McGlashan, Wash. Blvd. at Oak St. Relays KGFJ 24 hours daily.
25.950	W9XUP	**ST. PAUL, MINNESOTA.** 11.56 m. Relays KSTP evenings.
21.550	GST	**DAVENTRY, ENG.,** 13.92 m., Addr. (B.B.C., London) Irregular at present.
21.540	W8XK	**PITTSBURGH, PA.,** 13.93 m., Addr. Grant Bldg. Relays KDKA 6.45-9 am. Also Sunday. 6 pm.
21.530	GSJ	**DAVENTRY, ENG.,** 13.93 m., Addr. (See 21.550 mc.) 5.45-10.30 am.
21.520	W2XE	**NEW YORK CITY,** 13.94 m., Addr. Col. Broad. Syst., 485 Madison Ave. Daily exc. Sat. and Sun. 7.30-10 am. Sat. and Sun. 8 am.-1 pm.
21.500	W2XAD	**SCHENECTADY, N. Y.,** 13.95 m., General Electric Co., 8 am.-12 n.
21.470	GSH	**DAVENTRY, ENG.,** 13.97 m. (See 21.550 mc.), 5.45 am.-12 n.
21.450	DJS	**BERLIN, GERMANY,** 13.99 m., Addr., Broadcasting House. 12.05-11 am.
19.020	HS8PJ	**BANGKOK, SIAM,** 15.77 m. Mondays 8-10 am.
18.480	HBH	**GENEVA, SWITZERLAND,** 16.23 m., Addr. Radio Nations. Sun., 10.45-11.30 am.

16 Met. Broadcast Band

Mc.	Call	
17.820	—	**ROME, ITALY.** 16.84 m., Addr. (See 2RO, 11.81 mc.) Relays 2RO to 6 pm. irregularly.
17.810	TPB3	**PARIS, FRANCE,** 16.84 m. Addr. (See 15.245 mc.) 9.30-11 am.
17.800	TGWA	**GUATEMALA CITY, GUAT.,** 16.84 m., Addr. Ministre De Fomento. Irregular.
17.790	GSG	**DAVENTRY, ENG.,** 16.86 m., Addr. B.B.C., London. 5.45 am.-12 n., 12.20-4 pm.
17.785	JZL	**TOKYO, JAPAN,** 16.87 m. Irregular.
17.780	W3XL	**BOUND BROOK, N. J.,** 16.87 m., Addr. Natl. Broad. Co., 9 am.-8 pm.
17.770	PHI2	**HUIZEN, HOLLAND,** 16.88 m., Addr. (See PHI, 11.730 mc.) Daily 7.40-8.40 am. Tues. and Thurs., 7.25-8.40 am.
17.760	DJE	**BERLIN, GERMANY,** 16.89 m., Addr. Broadcasting House. 12.05-10 am.; also Sun. 11.10 am-12.25 pm. Daily 4.50-10.45 pm.
17.760	W2XE	**NEW YORK, N. Y.,** 16.89 m., Addr. Col. Broad. System, 485 Madison Ave. Irregular.
17.755	ZBW5	**HONGKONG, CHINA,** 16.9 m., Addr. P.O. Box 200. 4-10 am. Irregular.

End of Broadcast Band

Mc.	Call	
17.310	W2XGB	**HICKSVILLE, L. I., N. Y.,** 17.33 m., Addr. Press Wireless, Box 296. Tests 9.30-11.30 am. except Sat. and Sun.
15.550	CO9XX	**TUINICU, ORIENTE, CUBA,** 19.29 m., Addr. Frank Jones, Central Tuinicu, Tuinicu, Santa Clara. Broadcasts irregularly evenings.
15.510	XOZ	**CHENGTU, CHINA,** 19.34 m. Daily 9.45-10.30 am.
15.370	HAS3	**BUDAPEST, HUNGARY,** 19.52 m., Addr. Radiolabor, Gyali Ut 22. Sun. 9-10 am.
15.360	DZG	**ZEESEN, GERMANY,** 19.53 m., Addr. Reichspostzenstralamt. Tests irregularly.
15.360	—	**BERNE, SWITZERLAND.** 19.53 m. Irreg. 6.45-7.45 pm.

19 Met. Broadcast Band

Mc.	Call	
15.340	DJR	**BERLIN, GERMANY,** 19.56 m., Addr. Br'dcast'g House, 8-9 am., 4.50-10.45 pm.
15.330	W2XAD	**SCHENECTADY, N. Y.,** 19.56 m., Addr. General Electric Co. Relays WGY, 12.15-6 pm.
15.320	OLR5B	**PRAGUE, CZECHOSLOVAKIA.** 19.58 m. Addr. (See 11.840 mc.) Sun., Wed., Sat. 5-5.10 pm.: Mon., Tues., Thurs., Fri. 6.55-9.55 pm.
15.310	GSP	**DAVENTRY, ENG.,** 19.6 m., Addr. (See 17.79 mc.) 3-5.15 am., 1.45-4 pm.
15.300	YDB	**SOERABAJA, JAVA, N. E. I.** 19.61 m. Addr. NIROM. 7.30 pm.-2 am.
15.300	XEBM	**MAZATLAN, SIN., MEX.,** 19.61 m., Addr. Box 78, "El Pregonero del Pacifico." Irregularly 9-10 am., 1-2, 8-10 pm.
15.300	—	**ROME, ITALY.** 19.61 m., Addr. (See 2RO, 11.81 mc.) Relays 2RO to 6 pm. irregularly.
15.290	LRU	**BUENOS AIRES, ARG.,** 19.62 m., Addr. El Mundo. Relays LR1, 7-9 am.
15.280	HI3X	**CIUDAD TRUJILLO, D. R.,** 19.63 m. Relays H1X Sun. 7.40-10.40 am. Weekdays 12.10-1.10 pm.
15.280	DJQ	**BERLIN, GERMANY,** 19.63 m., Addr. Broadcasting House. 12.05-10 am., 4.50-10.45 pm. Also Sun. 11.10 am-12.25 pm.
15.270	W2XE	**NEW YORK CITY,** 19.65 m., Addr. (See 21.520 mc.) Daily except Sat. and Sun. 1-6 pm., Sat. and Sun. 2.30-6 pm.
15.260	GSI	**DAVENTRY, ENG.,** 19.66 m., Addr. (See 17.79 mc.) 12.20-1.30 pm.
15.250	W1XAL	**BOSTON, MASS.,** 19.67 m., Addr. University Club. Sun. 10 am.-12 n.
15.245	TPA2	**PARIS, FRANCE,** 19.68 m., Addr. 98 Bis. Blvd. Haussmann. "Paris Mondial" 6-11 am.
15.230	HS8PJ	**BANGKOK, SIAM,** 19.7 m. Irregularly Mon. 8-10 am.
15.230	OLR5A	**PRAGUE, CZECHOSLOVAKIA,** 19.7 m. Addr. (See OLR4A, 11.84) Irreg. 7.55-10.55 pm.
15.220	PCJ2	**HUIZEN, HOLLAND,** 19.71 m., Addr. N. V. Philips' Radio Hilversum. Tues. 2-3.30 am., Wed. 9.30-11.30 am.
15.210	W8XK	**PITTSBURGH, PA.,** 19.72 m., Addr. (See 21.540 mc.) 8 am.-6 pm.
15.200	DJB	**BERLIN, GERMANY,** 19.74 m., Addr. (See 15.280 mc.) 12.05-11 am., 4.50-10.45 pm. Also Sun. 11.10 am.-12.25 pm.
15.190	—	**ROME, ITALY.** 19.75 m. Relays 2RO till 6 pm., irreg.
15.190	—	**LAHTI, FINLAND.** 19.75 m. Addr, (See OFE, 9.5 mc.) Irregular.
15.190	ZBW4	**HONGKONG, CHINA,** 19.75 m., Addr. P. O. Box 200. Irregular. 11.30 pm. to 1.15 am., 3-10 am.
15.180	RW96	**MOSCOW, U.S.S.R.,** 19.76 m. Mon., Tues., Fri., Sat. 2.30-3.30 pm. Daily 3-4 am. Mon., Wed., Thurs. 7-9.15 pm.
15.180	GSO	**DAVENTRY, ENG.,** 19.76 m., Addr. (See 17.79 mc.) 4.15-6, 6.20-8.30 pm., 3-5.15 am., 9 am.-12 n.
15.170	TGWA	**GUATEMALA CITY, GUAT.,** 19.77 m., Addr. (See 17.8 mc.) Daily 10.45-11 am.; Sun. 10.45 am.-6 pm.
15.160	XEWW	**MEXICO CITY, MEXICO,** 19.79 m., 12 n.-12 m., irregular.
15.160	JZK	**TOKYO, JAPAN,** 19.79 m. Irregular.
15.160	VUD3	**DELHI, INDIA,** 19.79 m., Addr. All India Radio. 1.30-3.30 am., 8.30-10.30 pm.
15.155	SM5SX	**STOCKHOLM, SWEDEN,** 19.79 m., Daily 11 am.-5 pm., Sun. 9 am.-5 pm.
15.150	YDC	**BANDOENG, JAVA,** 19.8 m., Addr. N. I. R. O. M. 6-7.30 pm., 10.30 pm.-2 am., Sat. 7.30 pm.-2 am., daily 5.30-10.30 am.
15.140	GSF	**DAVENTRY, ENG.,** 19.82 m., Addr. (See 17.79 mc.) 3-5.15 am., 5.45 am.-12 n.
15.130	TPB6	**PARIS, FRANCE.** 19.83 m., Addr. "Paris Mondial," 98 Bis Blvd. Haussmann, 2-5 am.
15.130	W1XAL	**BOSTON, MASS.,** 19.83 m., Addr. World-Wide B'cast'g Foundation. University Club. 10-11 am., Mon.-Fri.
15.120	HVJ	**VATICAN CITY,** 19.83 m., 10.30-10.45 am., Tues., Wed. & Thurs.
15.110	DJL	**BERLIN, GERMANY,** 19.85 m., Addr. (See 15.280 mc.) 12 m.-2, 8-9 am., 10.40 am.-4.25 pm., also Sun. 6-8 am.
15.080	RKI	**MOSCOW, U.S.S.R.,** 19.87 m. Works Tashkent near 7 am. Broadcasts Sun. 12.15-2.30 pm. Daily 7-9.15 pm.

End of Broadcast Band

Mc.	Call	
14.940	PSE	**RIO DE JANEIRO, BRAZIL.** 20.08 m., Broadcasts Wed. 3.45-4.15 pm.
14.600	JVH	**NAZAKI, JAPAN,** 20.55 m. Broadcasts irregularly 5-11.30 pm. Works Europe 4-8 am.
14.535	HBJ	**GENEVA, SWITZERLAND,** 20.64 m., Addr. Radio Nations. Broadcasts Sun. 1.45-2.30 pm., Mon. 7-8.30 pm.

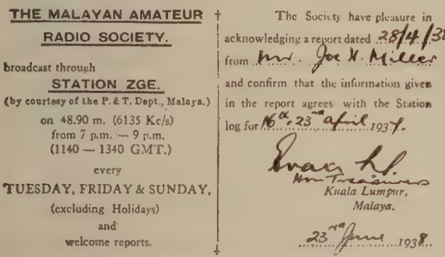
(Continued on page 476)

All Schedules Eastern Standard Time

Let's Listen In

With Joe Miller

● BEGINNING a new period of service on this page after a brief surcease, we look forward to your co-operation, as in the past. Reports on DX heard, amateur 'phone, SWBC, and commercial 'phone are equally welcomed, and should be mailed to reach us at RADIO & TELEVISION, 99 Hudson St., New York City, not later than 5th of each month.



THE MALAYAN AMATEUR RADIO SOCIETY.

broadcast through

STATION ZGE.

(by courtesy of the P. & T. Dept., Malaya.)

on 48.90 m. (6135 Kc/s)
from 7 p.m. — 9 p.m.
(1140 — 1340 GMT.)

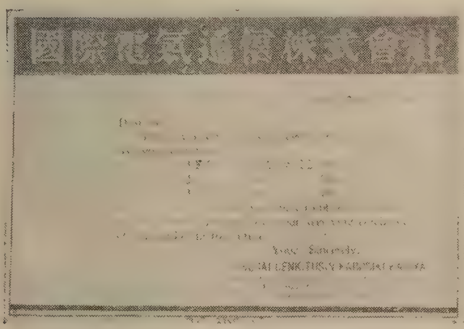
every

TUESDAY, FRIDAY & SUNDAY,
(excluding Holidays)
and
welcome reports.

The Society have pleasure in acknowledging a report dated 28/4/38 from Mr. Joe H. Miller and confirm that the information given in the report agrees with the Station log for 16th & 23rd april 1938.

Evans
Hon Treasurer
Kuala Lumpur, Malaya.

23rd June 1938.



Two fine catches—ZGE and JFZC

As our mag's title was recently altered, VAC certificates had to be withdrawn till new plates, with new title, were made, so kindly be patient, OM's—the certificates are being mailed.

Here's to DX:

PAPUA

VHPM, 8.08 mc., Port Moresby, has been heard several times, once at 6:25 a.m., and much earlier, at 4:05 a.m. This is a new country for all DXers, and can be heard if one tries around 5:30-6:30 a.m. when it is usually on. This station has been used only for telephony, as far as we know. Reports can be sent to VHPM, Port Moresby, Papua. The signal should be well heard now in the cool weather, so try to add this FB new country to your log!

Another station at Port Moresby, VIG, on 7.31 mc., has been reported rebroadcasting a local BC station's programs, usually on 1st and 3rd Sats. of each month, from 3-5 a.m., though this is not a regular schedule, probably more of a test broadcast, occasionally.

ANGOLA

CR6AA, 13.00 mc., at Lobito, is now heard regularly on this new frequency, besides its old 7.177 mc. wave. Evidently the 9 mc. freq. is to be used only occasionally, as conditions warrant.

This new frequency should be well heard this winter, much easier to log than that 7 mc. sig., right in the thick of the 40 meter band's hash.

The schedule remains the same, Wed. and Sat.—2:45-4:30 p.m.

This station QSL's all reports with a handsome card, shown here some time ago. It is well worth having, being a "hard-to-get" country for all DXers.

Send your reports to P. O. Box 103, Lobito, Angola, Port. West Africa.

INDIA

VUD3, 15.16 mc., at Delhi, is putting a beautiful R8 signal into New York right now, and should continue doing so for a long time to come. You can't miss it, all clear by itself on 15.16 mc., just to low freq. side of England's GSO.

A *carrier* can be heard just before schedule, 8:30 p.m. and at 8:30 sharp, you'll hear chimes and bells striking the hour. Then an announcement in perfect English, mentioning call as VUD3.

Here's an Asiatic you can all hear, as we get it swell when using a 3 tube regenerative set! It really does pound in!

You probably feel as we do, regarding the mass of schedules and frequencies published on the new National Xmtrs in India, and it is a bother going through all that, when one feels he can't hear 'em anyway! But here's one we will vouch for! Schedule is from 8:30-10:30 p.m. *daily*, best signal at 8:30, and gradually weakening towards 10:30.

Veris have been hard to elicit from the Indian broadcasters, for some reason, but we have a QRA which should be OK, being taken from a veri. Here 'tis: Lieut. N. A. S. Lakshamanan, Station Director, All India Radio, Delhi, India. This, of course, for Delhi transmitters.

VUD2, on 9.59 mc., should be well heard when this comes out, as last year, so keep a watch out for this frequency, undoubtedly carrying same program. Best "sig," as on VUD3, is at 8:30 p.m. VUD2 is at Delhi, too.

We could give you the whole mess of station schedules, etc., but we prefer telling you what you can actually hear, and be able to "log." Do you agree with our policy?

VVN, at Madras, on 13.35 mc., using inverted speech, very strong at 4 a.m., with usual Asiatic "flutter" noticeable on signal.

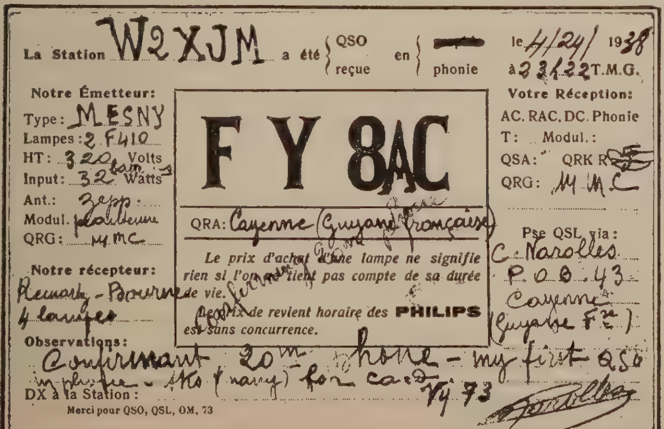
Jack Buitekant, Bronx, is to be congratulated on landing and getting verified, VWY2, at Poona, India. Nice going, OM, for a beginner!

INDO-CHINA

FZS, 18.388 mc., at Saigon, was logged again, at 7:03 a.m. the other day, in QSO with FTM, 19.355 mc., St. Assise, France.

FTM had called at 6:00 a.m. but no reply from Saigon; this in clear speech. FTM sends a musical signal consisting of 3 to 4 notes (tones) repeated over and over. At 7 a.m. these tones ceased, and we knew FTM would again call. We heard—*"allo Saigon, ici Paree,"* and, turning to FZS'

(Continued on page 489)



La Station W2XJM a été QSO ~~reçue~~ en ~~[illegible]~~ phonie le 4/24/ 1938 à 23/22 T.M.G.

Notre Émetteur:
Type: MESNY
Lampes: 2 F410
HT: 320 Volts
Input: 32 Watts
Ant.: Zepp
Modul. [illegible]
QRG: 14 MC

F Y 8AC

QRA: Cayenne (Guyane Française)

Le prix d'achat d'une lampe ne signifie rien si l'on ne tient pas compte de sa durée de vie.

Le prix de revient horaire des **PHILIPS** *est sans concurrence.*

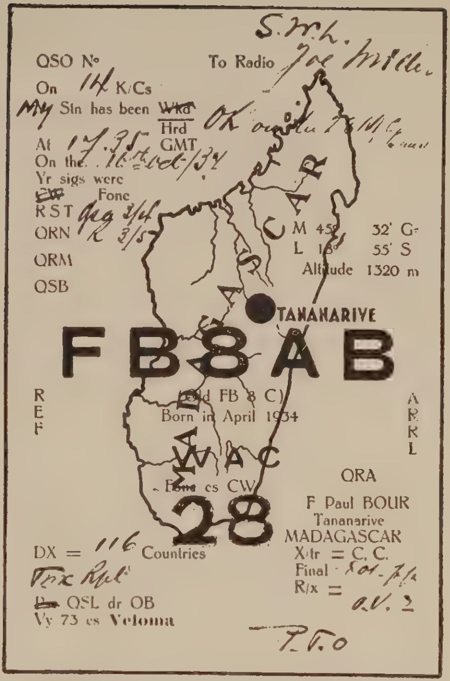
Votre Réception:
AC. RAC. DC. Phonie
T: Modul.:
QSA: QRK R
QRG: 14 MC

Pse QSL via:
C. Narolles
P. O. B. 43
Cayenne
(Guyane Fse)

Observations:
Confirmant 20m phone - my first QSO in phone - tks (navy) for card
Vy 73

DX à la Station:
Merci pour QSO, QSL, OM, 73

FY8AC — French Guiana. A plain white card with red lettering, but it's still a nice veri, hi!



S.W.L.

QSO No To Radio Joe Miller
On 14 K/Cs
My Stn has been ~~Wkd~~ Hrd OK [illegible]
At 17.35 GMT
On the 16th Oct/37
Yr sigs were ~~CW~~ Fone
RST [illegible] 3/4
QRN R 3/5
QRM
QSB

M 45° 32' G
L 18° 55' S
Altitude 1320 m

TANANARIVE

FB8AB

(Old FB 8 C)
Born in April 1934

REF ARRL

WAC
~~Fone~~ es CW

28

QRA
F Paul BOUR
Tananarive
MADAGASCAR

DX = 116 Countries
Xtr = C. C.
Final [illegible]
R/x = 0.V. 2

Tnx Rpt
~~Pse~~ QSL dr OB
Vy 73 es Veloma

P.T.O

FB8AB—Madagascar. Here's the prize QSL for our 10 meter harmonics reception of O M Paul's 20 meter signals. Blue letters, red map outline.

Mc.	Call	
14.440	—	**RADIO MALAGA, SPAIN,** 20.78 m. Relays Salamanca 8.15-8.45 pm. Sometimes 2-4 pm.
14.420	HCJB	**QUITO, ECUADOR,** 20.8 m. Daily exc. Mon. 10-11 pm.
14.166	PIIJ	**DORDRECHT, HOLLAND,** 21.15 m., Addr. (See 7.088 mc.) Sat. 12 n.-12.30 pm.
14.004	EA9AH	**TETUAN, SPANISH MOROCCO,** 21.4 m. Apartado 124. News at 4.30 and 7.15 pm. Relays Salamanca from 5.40 pm.
13.635	SPW	**WARSAW, POLAND,** 22 m. Daily 6-8 pm. Sat. & Sun. 6-9 pm.
12.460	HCJB	**QUITO, ECUADOR,** 24.08 m. Daily exc. Mon. 10-11 pm.
12.862	W9XDH	**ELGIN, ILL.,** 23.32 m. Press Wireless, Tests 2-5 pm.
12.235	TFJ	**REYKJAVIK, ICELAND,** 24.52 m. Works Europe mornings. Broadcasts Sun. 1.40-2.30 pm.
12.200	——	**TRUJILLO, PERU,** 24.58 m., "Rancho Grande." Address Hacienda Chiclin. Irregular.
12.060	RNE	**MOSCOW, U.S.S.R.,** 24.88 m. Daily 6-7 am., 12 n.-2 pm., 3-6, 10.15-11 pm., also Tues., Thurs. 8.30-9 pm., also Sun. 6-10.30 am., 12 n.-5 pm., 6-6.30, 8.30-9, 10.15-11 pm.
11.970	HI2X	**CIUDAD TRUJILLO, D. R.,** 25.07 m., Addr. La Voz de Hispaniola. Relays HIX Tue. and Fri. 8.10-10.10 pm.

25 Met. Broadcast Band

Mc.	Call	
11.920	TI2XD	**SAN JOSE, COSTA RICA.** 25.19 m. La Voz del Pilot. Apartado 1729. 11 am.-2 pm., 5-11 pm., exc. Sun.
11.910	CD1190	**VALDIVA, CHILE,** 25.2 m., P. O. Box 642. Relays CB69 10 am.-1 pm., 11 am.-10 pm.
11.900	—	**HANOI, FRENCH INDO-CHINA.** 25.21 m. "Radio Hanoi", Addr. Radio Club de l'Indochine. 12 m.-2 am., 6-10 am.
11.900	XEWI	**MEXICO CITY, MEXICO,** 25.21 m., Addr. P. O. Box 2874. Mon., Wed., Fri. 3-4 pm., 9 pm.-12 m. Tues. and Thur. 7.30 pm.-12 m., Sat. 9 pm.-12 m.
11.895	HP5G	**PANAMA CITY, PAN.,** 25.22 m., Addr. Box 1121. 9.30 am.-1 pm., 6-11 pm.
11.885	TPA3	**PARIS, FRANCE,** 25.24 m., Addr. (See 15.245 mc.) 2-5 am., 11.15 am.-6 pm.
11.885	TPB7	**PARIS, FRANCE,** 25.24 m. (See 15.245 mc.) 7-9.15, 9.30 pm.-12 m.
11.870	W8XK	**PITTSBURGH, PA.,** 25.26 m., Addr. (See 21.540 mc.) 6-8.45 pm.
11.865	——	**BERNE, SWITZERLAND.** 25.28 m. Irreg. 8-9 pm.
11.860	GSE	**DAVENTRY, ENG.,** 25.29 m., Addr. (See 11.75 mc.) 3-5.15, 5.45 am.-12 n.
11.855	DJP	**BERLIN, GERMANY,** 25.31 m., Addr. (See 15.280 mc.) Irregular 11.35 am.-4 pm.
11.840	KZRM	**MANILA, P. I.,** 25.35 m. Addr. Erlanger & Gallinger, Box 283. 9 pm.-10 am. Irregular.
11.840	CSW	**LISBON, PORT.,** 25.35 m. Nat'l Broad. Station. 11.30 am.-1.30 pm. Irregular.
11.840	OLR4A	**PRAGUE, CZECHOSLOVAKIA,** 25.34 m., Addr. Czech Shortwave Sta., Praha XII, Fochova 16. Daily 12.55-4.30 pm. Mon., Tues., Thurs., Fri. 7.55-10.55 pm., Sun. 5.55-8.55 pm.
11.830	W9XAA	**CHICAGO, ILL.,** 25.36 m., Addr. Chicago Federation of Labor. Irregular 7 am.-6 pm.
11.830	W2XE	**NEW YORK CITY,** 25.36 m., Addr. Col. Broad. System, 485 Madison Av., N.Y.C. 6.30-11 pm.
11.826	XEBR	**HERMOSILLA, SON., MEX.,** 25.37 m., Addr. Box 68. Relays XEBH. 1-4 pm., 9 pm.-12 m.
11.820	GSN	**DAVENTRY, ENG.,** 25.38 m., Addr. (See 11.75 mc.) Irregular.
11.810	2RO	**ROME, ITALY,** 25.4 m., Addr. E.I.A.R., Via Montello 5. Daily 4.40-8.45 am., 10 am.-9 pm.
11.805	COGF	**MATANZAS, CUBA,** 25.41 m., Addr. Gen. Betancourt 51. Relays CMGF. 2-3, 4-5, 6-11 pm.
11.805	OZG	**SKAMLEBOAEK, DENMARK,** 25.41 m. Addr. Statsradiofonien. Irreg.
11.801	DJZ	**BERLIN, GERMANY,** 25.42 m. 7.15-10.50 pm.
11.800	JZJ	**TOKYO, JAPAN,** 25.42 m., Addr. Broadcasting Co. of Japan, Overseas Division. 7-7.30, 8-9.30 am., 2.30-4, 4.30-5.30, 8-8.30 pm., 12.30-1.30 am.
11.795	DJO	**BERLIN, GERMANY,** 25.43 m., Addr. (See 15.280 mc.)
11.790	WIXAL	**BOSTON, MASS.,** 25.45 m., Addr. (See 15.250 mc.) Daily 4.55-6.30 pm., Tues., Thur., 4.40-6.30 pm., Sat. 1.45-6 pm., Sun. 5-6.30 pm.
11.780	HP5G	**PANAMA CITY, PAN.,** 25.47 m., Addr. Box 1121. Heard till 12 m.
11.780	OFD	**LAHTI, FINLAND.** 25.47 m. Addr. (See OFE, 9.5 mc.) 1.05 am.-2.05 pm.
11.770	DJD	**BERLIN, GERMANY,** 25.49 m., Addr. (See 15.280 mc.) 10.40 am.-4.30 pm., 4.50-11 pm.
11.760	TGWA	**GUATEMALA CITY, GUAT.,** 25.51 m. (See 17.8 mc.) Irregular 10-11.30 pm. Sun. 6-11.30 pm., irregular.
11.760	XETA	**MONTEREY, MEX.** 25.51 m., Addr. Box 203. Relays XET, 1-3.30 pm. and evenings.
11.760	OLR4B	**PRAGUE, CZECHOSLOVAKIA,** 25.51 m., Addr. (See 11.840 mc.) Irregular.
11.750	GSD	**DAVENTRY, ENG.,** 25.53 m., Addr. B.B.C., London, 3-5.15 am., 10.45 am.-6.00 pm., 6.20-8.30, 9.20-11.25 pm.
11.740	COCX	**HAVANA, CUBA.** 25.55 m. P. O. Box 32. Daily 8 am.-1 am. Sun. 8 am.-12 m. Relays CMX.
11.740	HVJ	**VATICAN CITY,** 25.55 m. Testing irregular.
11.730	PHI	**HUIZEN, HOLLAND,** 25.57 m., Addr. N. V. Philips' Radio. Daily 6.15-6.45 pm. Sat. 7.15-7.45 pm.
11.730	WIXAL	**BOSTON, MASS.,** 25.57 m., Addr. World-Wide B'cast'g Foundation, University Club. Daily exc. Sat. and Sun. 9-11 pm.
11.720	CJRX	**WINNIPEG, CANADA,** 25.6 m., Addr. James Richardson & Sons, Ltd. Daily 6 pm.-12 m., Sun. 5-10 pm.
11.718	CR7BH	**LAURENCO MARQUES, PORTUGUESE E. AFRICA,** 25.6 m. Daily 12.05-1, 4.30-6.30, 9.30-11 am., 12.05-4 pm., Sun. 5-7 am., 10 am.-2 pm.
11.715	TPA4	**PARIS, FRANCE,** 25.61 m., (See 15.245 mc.) 7-9.15 pm., 9.30 pm.-12 m.
11.710	SBP	**MOTALA, SWEDEN,** 25.63 m., 1.20-2.05, 6-9 am., 11 am.-1 pm., Sat. 1.20-2 am., 6 am.-1.30 pm., Sun. 3 am.-1.30 pm. Wed. and Sat. 8-9 pm.
11.710	YSM	**SAN SALVADOR, EL SALVADOR,** 25.63 m., Addr. (See 7.894 mc.) Irregular 1.30-2.30 pm.
11.710	—	**SAIGON, FRENCH INDO-CHINA** 25.63 m., Addr. Boy-Landry, 17 Place A Foray. 6-9.15 am.
11.700	HP5A	**PANAMA CITY, PAN.,** 25.65 m. Addr. Radio Teatro, Apartado 954. 10 am.-10 pm.
11.700	CB1170	**SANTIAGO, CHILE,** 25.65 m. Addr. P.O. Box 706. Relays CB89 6 pm.-12 m.

End of Broadcast Band

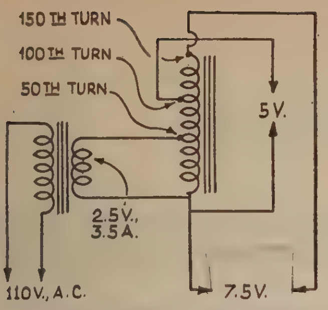
Mc.	Call	
11.676	IQY	**ROME, ITALY.** 25.7 m. Relays 2RO 1.35-2.25, 6-9 pm.
11.530	SPD	**WARSAW, POLAND,** 26 m., Addr. 5 Mazowiecka St. 6-9 pm.
11.402	HBO	**GENEVA, SWITZERLAND,** 26.31 m., Addr. Radio Nations. Sun. 7-7.45 pm., Mon. 1-1.15 am., 7-8.30 pm.
11.040	CSW7	**LISBON, PORTUGAL,** 27.17 m., Addr. Nat. Broad. Sta. 1.30-5 pm.
11.000	PLP	**BANDOENG, JAVA,** 27.27 m. Relays YDB. 6-7.30 pm., 10.30 pm.-2 am., 4.30-10.30 or 11 am. Sat. until 11.30 am.
10.960	——	**TANANARIVE, MADAGASCAR,** 27.36 m., Addr. (See 9.38 mc.) 12.30-45, 3.30-4.30, 10-11 am. Sun. 2.30-4 am.
10.670	CEC	**SANTIAGO, CHILE,** 28.12 m. Irregular.
10.660	JVN	**NAZAKI, JAPAN,** 28.14 m. Broadcasts daily 2-8 am. Works Europe irregularly at other times.
10.600	ZIK2	**BELIZE. BRIT. HONDURAS,** 28.25 m., Tue., Thurs., Sat. 1.30-2, 8.30-9 pm.
10.535	JIB	**TAIHOKU, TAIWAN,** 28.48 m. Works Japan around 6.25 am. Broadcasts, relaying JFAK 9.05-10 am., 1-2.30 am. Sun. to 10.15 am.
10.370	EAJ43	**TENERIFFE, CANARY ISLANDS,** 28.93 m. Relays Salamanca, Spain, 2-4, 5-9.45 pm.
10.350	LSX	**BUENOS AIRES, ARG.,** 28.98 m., Addr. Transradio International. Tests irregularly.
10.330	ORK	**RUYSSELEDE, BELGIUM,** 29.04 m. Broadcasts 1.30-3 pm. Works OPM 1-3 am., 3-5 pm.
10.290	DZC	**ZEESEN, GERMANY,** 29.16 m., Addr. (See 15.360 mc.) Irregular.
10.260	PMN	**BANDOENG, JAVA,** 29.24 m. Relays YDB 6-7.30 pm., 10.30 pm.-2 am., 4.30-10.30 or 11 am., Sat. to 11.30 am.
10.220	PSH	**RIO DE JANEIRO, BRAZIL,** 29.35 m., Addr. Box 709. Broadcasts 6-9 pm.
10.042	DZB	**ZEESEN, GERMANY,** 29.87 m., Addr. Reichspostzenstralamt. Irregular.
9.980	COBC	**HAVANA, CUBA,** 30.04 m., Addr. P. O. Box 132. Relays CMBC 6.55 am.-12 m.
9.940	JDY	**DAIREN, MANCHUKUO,** 30.18 m. Relays JQAK daily 7-8 am. Works Tokyo occasionally in early am.
9.860	EAQ	**MADRID, SPAIN,** 30.43 m., Addr. Post Office Box 951. 7.30-8, 8.40-9 pm.
9.833	COCM	**HAVANA, CUBA.** 30.51 m. Addr. Transradio Columbia, P. O. Box 33. 8-1 am. Relays CMCM.
9.830	IRF	**ROME, ITALY,** 30.52 m. Works Egypt afternoons. Relays 2RO, 6-9 pm.
9.760	——	**SAIGON, INDO-CHINA,** 30.72 m., Addr. 17, Place A. Foray. "Radio Boy-Landry." Heard 6-9.15 am.
9.740	COCQ	**HAVANA, CUBA,** 30.85 m. Addr. 25 No. 445, Vedado, Havana, 7-1 am. Sun. 6.55 am.-12.30 pm.
9.710	CSW5	**LISBON, PORTUGAL.** 30.87 m. Addr. Nat. Broad. Sta. 5-8 pm.
9.700	——	**FORT DE FRANCE, MARTINIQUE,** 30.9 m., Addr. P. O. Box 136. 11.30 am.-12.30 pm., 6.15-7.50 pm.
9.690	TI4NRH	**HEREDIA, COSTA RICA,** 30.94 m., Addr. Amando C. Marin, Apartado 40. Sun. 7-8 am. Tues., Thurs., Sat. 9-10 pm.
9.685	TGWA	**GUATEMALA CITY, GUAT.,** 30.96 m. Daily 10-11.30 pm.; Sun. 6-11.30 pm.
9.680	ZHP	**SINGAPORE, MALAYA.** 30.98 m. Sun. 5.40-9.40 am., Wed. 12.40-1.40 am., Mon.-Fri. 4.40-9.40 am., Sat. 12.25-1.40 am., 4.40-9.40 am., 10.40 pm.-1.10 am. (Sun.).
9.675	DZA	**ZEESEN, GERMANY,** 31.01 m., Addr. (See 10.042 mc.) Irregular.
9.670	—	**ROME, ITALY.** 31.03 m. Relays 2RO 6-9 p.m. Irregular.
9.670	W3XAL	**BOUND BROOK, N. J.,** 31.03 m. Addr. NBC, N. Y. C. 5 pm.-12 m.
9.660	LRX	**BUENOS AIRES, ARG.,** 31.06 m., Addr. El Mundo. Relays LR1, 9.30 am.-11 pm.
9.650	CS2WA	**LISBON, PORTUGAL,** 31.09 m., Addr. Radio Colonial. Tues., Thurs. and Sat. 3.30-6 pm.
9.645	HH3W	**PORT-AU-PRINCE, HAITI,** 31.1 m., Addr. P. O. Box A117. 1-2, 7-8 pm.
9.640	CXA8	**COLONIA, URUGUAY,** 31.12 m., Addr. Belgrano 1841, Buenos Aires, Argentina. Relays LR3, Buenos Aires 6 am.-10 pm.
9.635	2RO	**ROME, ITALY,** 31.13 m., Addr. (See 11.810 mc.) 12.05—9 pm.
9.630	HJ7ABD	**BUCARAMANGA, COL.,** 31.14 m. 10 am.-12 n., 4-11 pm.
9.625	JFO	**TAIHOKU, TAIWAN,** 31.16 m. Relays JFAK irreg. 4-10 am.
9.616	HJ1ABP	**CARTAGENA, COL.,** 31.20 m., Addr. P. O. Box 37. 11 am.-1 pm., 5-11 pm., Sun. 10 am.-1 pm., 3-6 pm.
9.615	ZRK	**KLIPHEUVAL, SOUTH AFRICA,** 31.2 m., Addr. P. O. Box 4559, Johannesburg. Daily, exc. Sat. 11.45 pm.-12.50 am. Daily exc. Sun. 3.20-7.20, 9-11.45 am., Sun. 3.30-4.30 or 4-5, 5.30-7, 9-11.45 am.
9.607	HP5J	**PANAMA CITY, PANAMA,** 31.23 m. Addr. Apartado 867. 12 n. to 1.30 pm., 6-10.30 pm.

(Continued on page 501)

All Schedules Eastern Standard Time

Radio Kinks

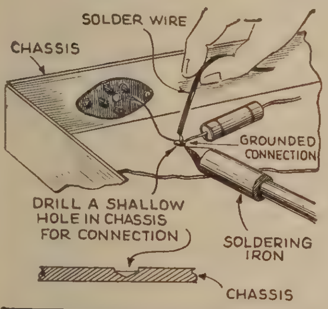
Each month the Editor will award a 2 year subscription for the best kink submitted. All other kinks published will be awarded eight months' subscription to RADIO & TELEVISION. Look over these kinks; they will give you some idea of what is wanted. Send a typewritten or ink description with sketch, of your favorite to the Kink Editor.



First Prize

Auto Transformer

A single winding auto transformer is a handy thing for securing a variety of filament voltages when used in conjunction with a filament transformer having but one low-voltage winding. The auto transformer may consist of 150 turns of No. 24 D.C.C. wire, wound on the core of an old audio transformer. It should be tapped at the 50th and the 100th turn. When connected as shown, it will deliver either 5 or 7½ volts from a transformer having a 2½ volt secondary. Other taps on the auto transformer will deliver any desired voltage. If the auto transformer heats up unduly, it would be advisable to use a heavier gauge wire than No. 24.—*Eugene Crow.*

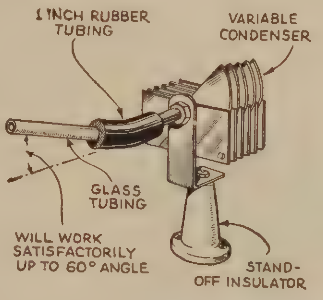


Soldering to Chassis

Perhaps the sloppiest looking piece of work the average constructor turns out is the "common ground" on the chassis, usually just a large blob of solder, irregular in shape and unpleasant in appearance. I have found a way in which to make solder joints to the chassis both easily and neatly. Simply drill a shallow hole at the point where the wire is to be connected to the chassis. This affords a well polished surface to which the solder easily adheres. Molten solder is then run into the cup-shaped depression thus formed, and the joint is made in a moment.—*John Metzler.*

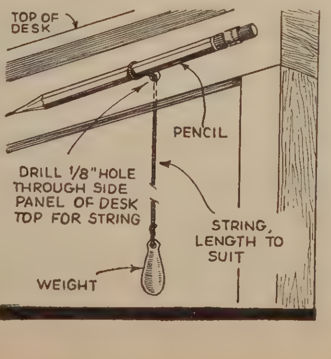
Flexible Coupling

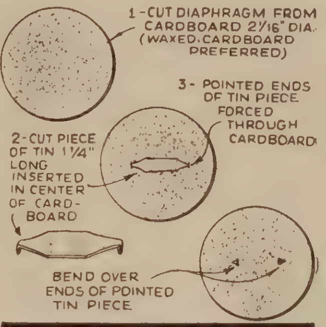
Here is a FB insulated and flexible extension condenser shaft; the shaft consists of a piece of glass tubing, which can be made any desirable length, fitting into a rubber coupler which in turn fits onto the condenser shaft. By using this arrangement, a costly extension is not needed when one uses an inclined panel, as this coupler will operate satisfactorily at angles up to 60 degrees.—*R. H. Alexander.*



Keeps Pencil Ready

Every Ham knows that the hardest piece of equipment to keep is a common, ordinary lead pencil. The pencil is always missing just when needed most to copy some real DX signals and I therefore hit upon this scheme to keep a pencil on the desk at all times. All you do is drill a ⅛" hole up under the desk, put a string through, tie the pencil to one end and a weight to the other. When you want the pencil, reach under the edge of the desk where the pencil is hidden and pull it out—the weight keeps the pencil in place. —*N. W. Slater.*




1-CUT DIAPHRAGM FROM CARDBOARD 2 1/16" DIA. (WAXED CARDBOARD PREFERRED)
3- POINTED ENDS OF TIN PIECE FORCED THROUGH CARDBOARD
2-CUT PIECE OF TIN 1 1/4" LONG INSERTED IN CENTER OF CARD-BOARD
BEND OVER ENDS OF POINTED TIN PIECE

Home-Made Phone Diaphragm

Sometimes the diaphragm of a headset becomes bent or otherwise damaged, in which case it is practically impossible to repair, and a new one must be purchased. This often necessitates considerable delay, during which time the phone is unusable.

Not wishing to wait while a new diaphragm was shipped from the factory, I cut a diaphragm from the waxed pasteboard in an old empty fruit jar, and fitted it with an armature cut from an old tin can—the pointed ends of the tin being pressed through the cardboard and clamped on the back. The results were so good that I put a cardboard diaphragm in the other phone, too. I found that the tone was better, and there was apparently less noise.—*Ernest Valencia.* (ED. NOTE: It may be necessary to add a washer to keep the tin armature from striking the phone's pole-pieces.)

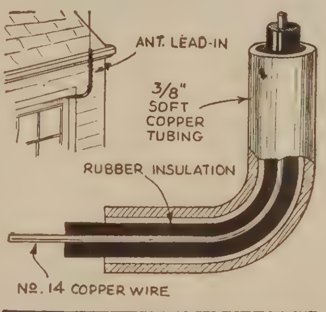
Umbrella Antenna

A discarded umbrella from which the silk or cotton has been removed makes a highly effective antenna for a portable receiver or transmitter. The ribs are left intact and are extended, as if in use. This type of antenna has considerable area, and while the metal is not as highly conductive as copper, it suffices very well for all practical purposes. If a porcupine antenna is preferred, the umbrella may be turned inside out. Incidentally, it does not matter if one or two of the ribs are broken—so a broken umbrella can be used.—*Mario La-Cognato.*

Co-Axial Lead-In

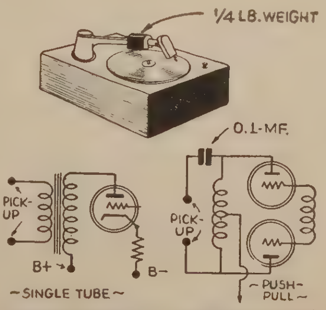
To make this neat lead-in panel, cut a piece of bakelite, plywood, or other suitable material to fit in the window sill, so that the window, when partly open, will rest on the top edge of the panel, which may be weather-stripped to provide a tight fit.

Holes are then drilled to accommodate insulated banana or G R jacks; jack feed-thru insulators may be used also. A lightning arrester, antenna coupler, and changeover switch, to connect the aerial to either the receiver or transmitter, may also be mounted on the board.—*Charles E. Baker, Jr.*



Automatic Code Sender

A novel, inexpensive, automatic code sender for the Ham using ICW, or code practice aid for prospective Hams, may be had by anyone possessing a phonograph and suitable amplifier. Merely feed the output of the amplifier through a 3 to 1 transformer into pickup, and that of an audio oscillator into input. A ¼ lb. weight is attached to the pickup to make a "home recording" needle cut. Records are of the "home recording" type, available at most music stores.—*Ed. Ramey.*

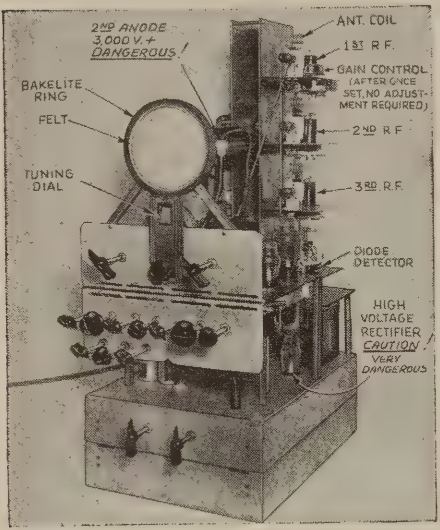


Build this 441 Line

T.R.F. Television Receiver

TELEVISION HAS TECHNICALLY BEEN DEVELOPED TO A HIGH DEGREE. THIS ARTICLE PROVIDES THE LATEST INFORMATION. IT WILL BE SOME TIME BEFORE HOME TELEVISION IS REALIZED. THE ART HAS GREAT OPPORTUNITIES FOR EXPERIMENTERS AND TECHNICIANS.

Part 2—Conclusion



The finished chassis—ready for a cabinet and a visual broadcast.

● IN the Nov. issue of this publication, a description was given of the cathode-ray tube mounting together with the D.C. restorer circuit, the synchronizing separator, two power-supplies, and the vertical and horizontal sweep circuits for a T.R.F. (tuned radio frequency) 441-line television receiver.

There follows a description of the tuned radio frequency circuits, the detector, the video amplifiers and a suitable antenna system for this receiver.

The reasons for choosing a T.R.F. receiver for television are obvious.

1. Simplicity of construction.
2. Broad frequency response (2,500,000 cycles side-bands must be passed for maximum detail of the transmitted image, according to present day standards).
3. Minimum number of tubes and associated apparatus.
4. Freedom from complicated alignment procedures.
5. Last, but not least, lower cost to the constructor.

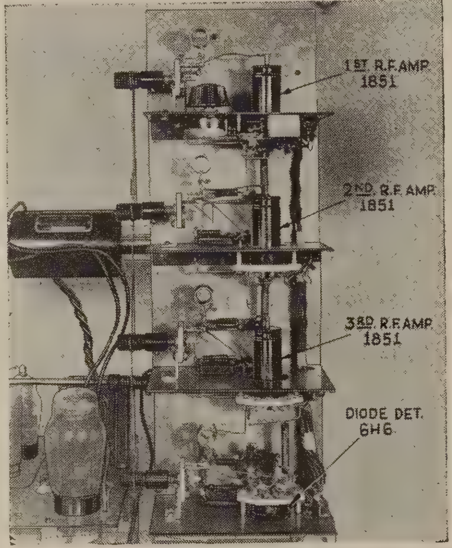
Three R.F. Stages

The radio frequency section of this receiver consists of three stages of amplification, using the special television amplifier tubes designated as type 1851, which have a very high mutual conductance, namely 9000 micromhos, as against 1200 to 1800 for a similar tube used in short-wave and broadcast receivers; yet the inter-electrode capacities are reasonably small.

Here is a word of caution on using the 1851 tubes. Under no circumstances must these tubes be used in a horizontal position, as the close spacing between the elements would surely cause trouble due to these elements sagging and touching one another.

Each R.F. stage is thoroughly shielded, preferably in copper or brass. Aluminum may be used, but because of the difficulty in soldering it, the shielding is not as effective.

The circuits used differ from the usual T.R.F. receiver only in that each stage is broadened out by "swamping" a fairly low resistor across the tuned circuit, in order to pass the unusually broad frequency band previously mentioned. Great care must be taken in the physical "layout" of the components so that every lead is as short as possible. By way of mention, no wire need be purchased for wiring the R.F. and V.F. circuits other than the filament, ground and B+ leads for the various tubes. The leads of each resistor and condenser serve satisfactorily for connectors, and in many instances these leads should be cut much shorter. Too much emphasis cannot be stressed in using the very *shortest* leads possible.



Side view of the R.F. stages. Note the careful interstage shielding.

Another very important factor to remember is to run all ground leads to one point in each shield, and then solder this point to a wire which runs down through all the shields on each side and connects only at *one* point on the chassis. In other words, there will be one wire from each stage (R.F., detector, and V.F.) running to one point of the chassis somewhere in the lowest compartment of the assembly, and there grounded to an actual ground.

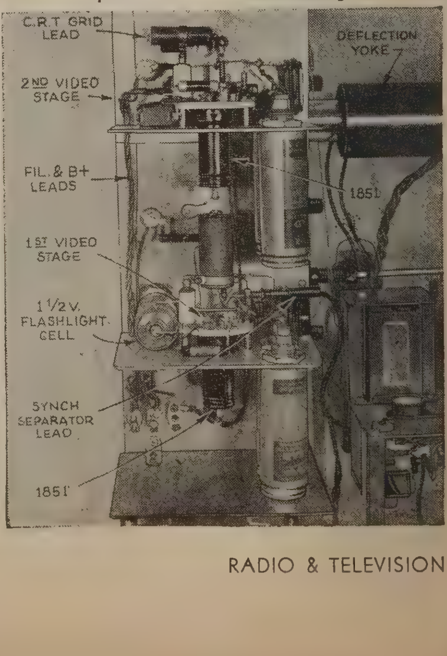
"Ground loops" are the greatest "bugaboo" in the construction of T.R.F. ultra short-wave receivers. Great care should be exercised to avoid them. In some cases, where oscillation of one or more of the R.F. stages is encountered, "by-passing" the filament leads or inserting a small R.F. choke in series with each filament lead will remedy the trouble. (See Fig. 1.)

Mica condensers are used throughout the R.F., detector and V.F. circuits for by-passing. Where paper condensers are imperative due to the large capacity required, these should be shunted with a mica condenser no smaller than .005 mf. The reason for this procedure is that at these very high frequencies, mica condensers have the least inductance. Therefore, the high frequencies will be by-passed by the mica condensers and the paper condensers will take care of the lower frequencies. The total gain of the receiver is governed by the biasing resistor of 1500 ohms in addition to the regular bias of 175 ohms in the cathode of the first R.F. stage.

Detector

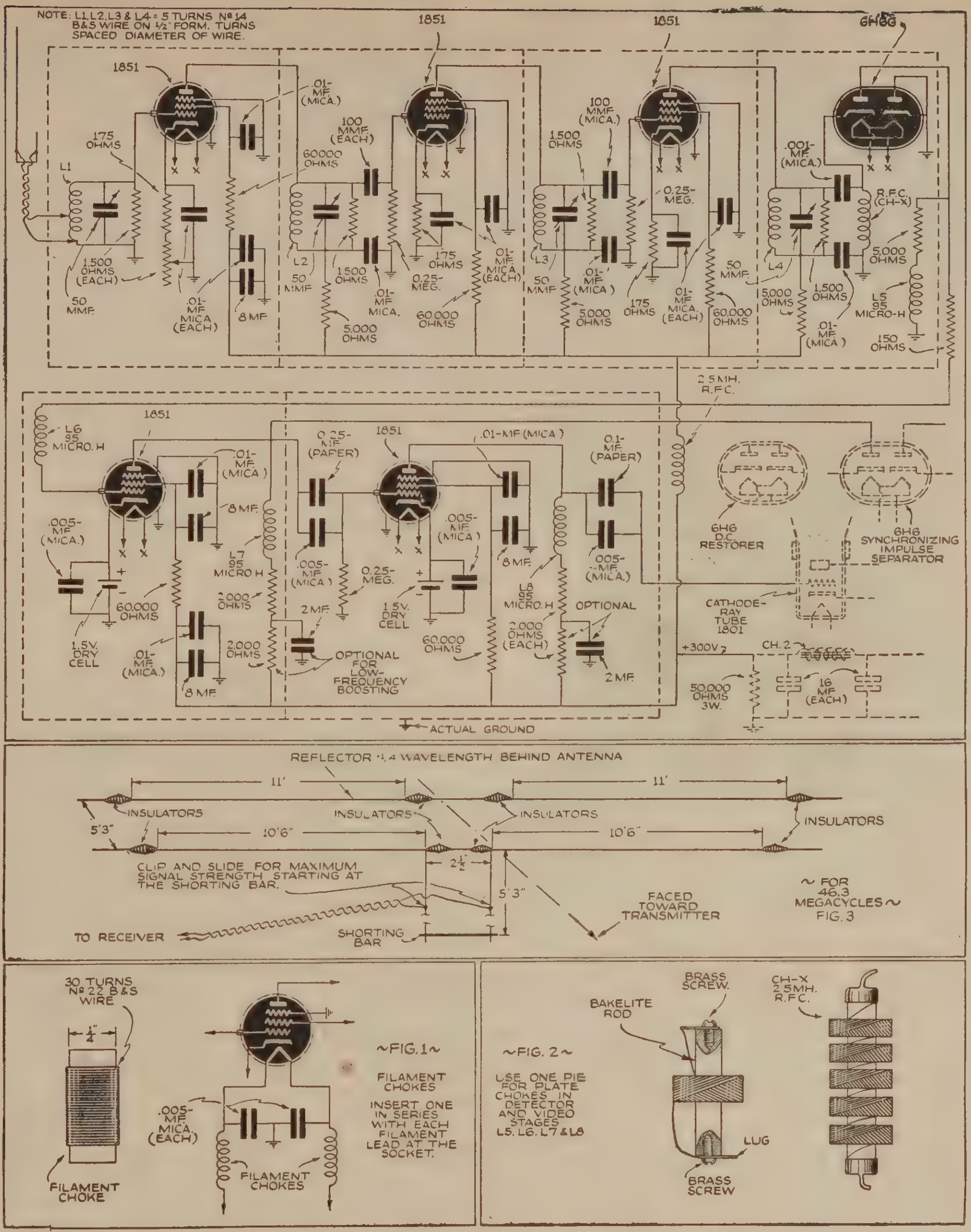
The detector is a diode of the 6H6 type, similar to the detectors used in broadcast receivers, with the exception that only one section is used in order not to load up the circuit with too much "shunting" capacity, and thus lose some of the very high video frequencies. The plate resistor of this tube is in series with a small choke which, with the reflected capacity of the succeeding tube, "boosts" the response at the highest frequency to be amplified and still keeps the phase change down to negligible proportions. This procedure is followed in the two succeeding video stages. (See Fig. 2 and the schematic diagram.)

Side view of video stages. A flashlight cell provides hum-free biasing.



Adding the R.F. and Video stages to the Townsend Television Receiver, thus completing the apparatus.

Henry Townsend



Schematic diagram at top shows R.F. and video circuits. Fig. 1 illustrates method of avoiding "ground loops"; Fig. 2, detail of special choke; Fig. 3, all antenna specifications.

Video Amplifier

The video amplifier also uses two of the special television steep slope pentodes designed expressly for this purpose. This amplifier must pass frequencies from 30 cycles to 2.5 megacycles and amplify these frequencies equally, with negligible phase displacements.

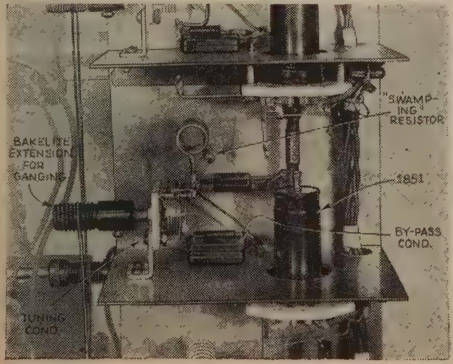
The data furnished with these tubes recommends that a cathode resistor of at least 150 ohms be used as bias. At radio frequencies, this resistor can be by-passed without the least bit of degeneration or phase change, but when we encounter this problem at a frequency of 30 cycles, it would require a by-pass condenser of at least 1000 microfarads. Even at the low voltage used, it would be quite a large condenser physically, and therefore, instead of the usual cathode biasing, a small 1½-volt dry cell was chosen for the bias of these tubes, shunted by a .01 mf. mica condenser. This eliminated all problems of phase change and degeneration at this frequency; and in the end, it is more economical.

By studying the photographs accompanying this article, the reader will notice that the physical "layout" of the R.F., detector and the video amplifier makes for extremely short leads between stages and, at the same time, looks well and functions better than would a less compact layout.

The condensers, tuning the three R.F. stages and detector, are so arranged that extensions (preferably of bakelite) protrude from the shield and these, in turn, can be "ganged" together with a "fish line" for single dial control.

The writer does not deem this the ultimate in mechanical perfection and perhaps the constructor will find a better way to do the same thing more efficiently and economically. However, this television receiver *works*, and works well.

A close-up of an R.F. stage, showing an easy method of ganging condensers.



If this article will instill a better thought or design in the mind of the constructor, either mechanically or electrically, he is at liberty to follow his reasoning to a conclusion.

It is to be remembered that the receiver incorporates only three R.F. stages and should be able to receive the transmission of television stations throughout the country for reasonable distances, but under no consideration should this be taken that a receiver located, say in Chicago, will pick up programs from New York or Los Angeles. The capability of this receiver will depend not only upon location, but the power of the transmitter and other conditions peculiar to ultra-short wave transmission and reception.

It was not so very long ago that we spoke of the horizon as the *limit* of transmission on these frequencies. However, greater distances have been covered, though not consistently. Another fact to keep in mind is that a greater signal strength is required to receive an image than to receive sound.

To make a check-up easier for yourself, locate the receiver for the first trial within a two or three mile radius of the transmitter. After results are obtained, greater distance between receiver and transmitter may be attempted. The set's performance will be most surprising even to the ultra critical observer.

The antenna system for this receiver consists of a half-wave doublet with a matching stub or transformer. (See Fig. 3.) Where space is available, a reflector consisting of two half-wave sections will materially increase the signal strength if properly placed and constructed.

As most of the television transmitters in the United States emit horizontally polarized waves, the antenna will be in a

(Continued on page 511)

3-Tube A.C. Receiver

Range 16 to 550 Meters

J. T. Wilcox, W2CLS

An inexpensive all-band receiver for the SWL.

Rear view of easy-to-build receiver.

● HERE is a simple 3-tube receiver that offers a surprising number of good features yet is simple enough for the novice to build and effective enough in its operation on the air to command the interest of the more experienced constructor and short-wave listener.

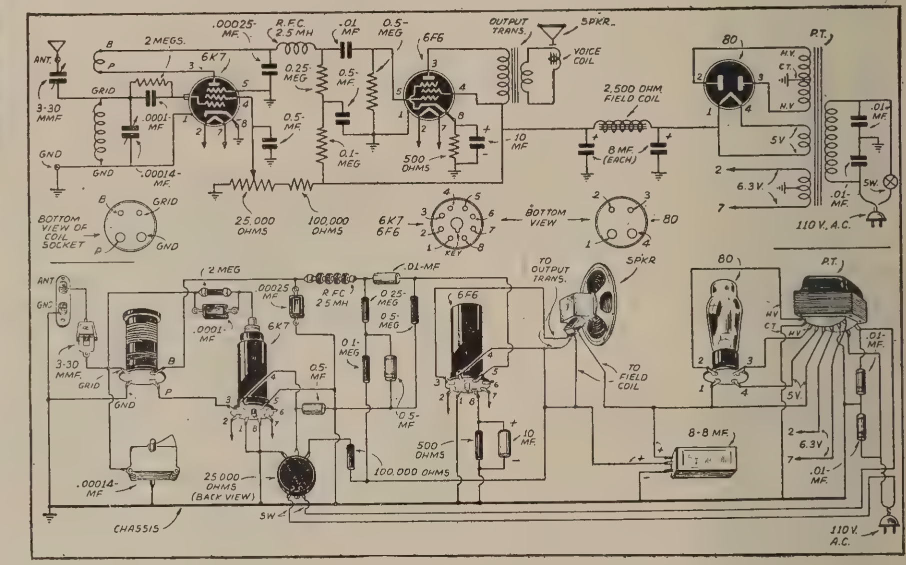
The receiver utilizes plug-in coils and provides continuous coverage of all ranges from 16 to 550 meters, or approximately 20,000 to 550 kilocycles. This includes the broadcast band and all the important short wave ranges, broadcast, police, amateur, aviation, marine, etc. All operating power is obtained from the 110-120 volts A.C. light lines.

A 6K7 high-gain metal amplifier tube is employed in a regenerative detector circuit as the first tube. The regenerative feature provides great sensitivity and is smoothly controlled by a potentiometer on the front panel, by means of which the voltage applied to the screen grid is varied. The antenna is capacity coupled to the grid of this tube, the condenser being one of the variable "trimmer" type, thus permitting the antenna coupling to be varied, and adapting the set to use with any type of antenna.

The output of the 6K7 is thoroughly filtered by means of a choke and condenser to prevent overloading or other trouble which might develop if R.F. were allowed to reach the audio circuits. It is then resistance-coupled to a 6F6 power-amplifier pentode, with additional filtering to prevent hum, this filter consisting of the 100,000-ohm resistor and .5 mf. condenser in the plate supply to the 6K7 tube. This audio tube is self-biased and the metal shells of both it and the 6K7 are grounded to insure a high order of operating stability.

The loud speaker is an electro-dynamic type with a built-in transformer to match it to the output impedance of the 6F6. Field-coil excitation is obtained by connecting this coil in the B plus lead, where it serves as a filter choke with the 8 mf. condensers.

(Continued on page 492)



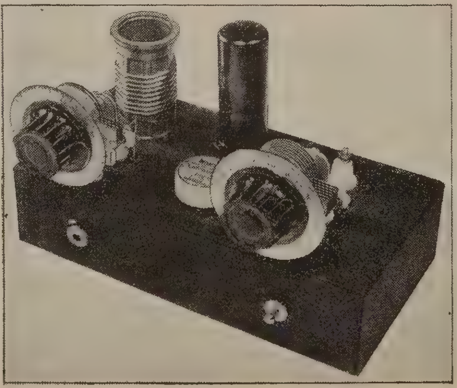
Wiring the 3-tube receiver is dead easy when you follow this detailed picture diagram.

Economical 25 Watt Xmitter Kit

● THIS transmitter was designed in an effort to eliminate the headaches that confront the newcomer to amateur radio. It represents one of the simplest, efficient transmitters that a beginner can obtain in its price bracket.

Arriving at a practical layout was not an easy matter. Many types of oscillators were built and tested in order to choose the one from which the engineers could get the most for the least cost. The regenerative crystal oscillator was undoubtedly the best oscillator from all angles. It was built with a minimum of parts and keyed stably with no difficulty. Using a 6L6 tube, approximately twenty-five watts was obtained on the fundamental frequency and good output was secured on the second harmonic, with this Eagle FB25 transmitter. With a 160 and 80 meter crystal, the four most popular amateur channels are covered. The only tools necessary for construction are a pair of pliers, a soldering iron and a screwdriver. The power supply is mounted on a similar chassis to the transmitter's and delivers 425 volts of well-filtered D.C. No difficulties should be encountered in wiring the outfit, and the placement of resistors and condensers is left to the discretion of the constructor, who should attempt to keep the R.F. leads as short as possible.

New 25 watt Xmitter, available in kit form.

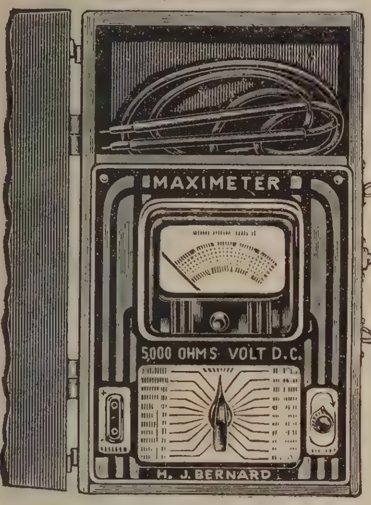


Tuning the rig is simple: First, the crystal and the desired plate coil are placed in their respective sockets and the power-pack cable plugged into its receptacle on the rear of the chassis. A small neon tube, which is used as a resonance indicator instead of a milliammeter for the sake of economy, should be placed on the stator of the plate tuning condenser C-1. The plate and filament voltage should be switched on and with the key closed, C-1 should be rotated until the neon tube reaches maximum brilliancy. Now the antenna should be connected and the antenna tuning condenser C-2 rotated until a point is reached where

(Continued on page 492)

WORLD'S LOWEST-PRICED *QUALITY* TEST UNITS

AMAZING ANALYZERS

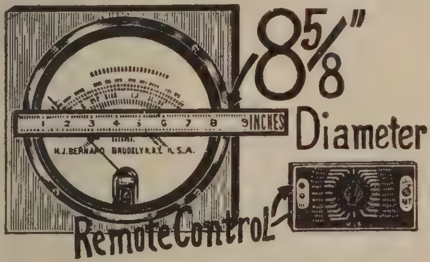


5,000 OHMS PER VOLT D.C.

MAXIMETER, above, with 4½" square meter, provides the first **complete** set of ranges ever offered. D-C ranges are at **5,000 OHMS PER VOLT**, a-c at 1,200 ohms per volt, including exclusive output meter range of 150 millivolts (.15 volt) for connection across voice coil when aligning receivers. Readings obtained before the a.v.c. starts working. All batteries self-contained. **29 RANGES**

0-10-50-250-500-2500 volts d.c., all at 5,000 ohms per volt
0-1-10-100-1,000 ma (one amp.) d.c.
0-3,000 ohms (20 ohms center); 30,000, 300,000, 3,000,000 and 30,000,000 ohms.
0-150 millivolts a.c. output meter
0-15-150 volts a.c. output meter (condenser self-contained)
0-15-150-1,500 volts a.c.
Minus 10 to plus 58 DB in 3 ranges
(.0005-.05 mfd.) (.05-50 mfd.)
(.14-14 henries) (14-14,000 henries)
0-150 watts for a-c line. 0-1.3 amperes a.c.

Model 384 Master Micro-Multimeter, the BERNARD MAXIMETER; shpg. weight 12 lbs. Net Price **$29.90**



Giant Multimeter with remote control box, same ranges as MAXIMETER but using 8⅝" meter, 1,000 ohms per volt d.c., with 2.5 meg. limit. **Model 388 Bernard ATLAS. Shipping weight 6 lbs. Net Price**......... **$29.90**

PUSH-BUTTON TUBE TESTER

AN up-to-the-minute push-button tube tester and tube seller for direct readings on all tubes, both metal and glass, whether a-c or battery types, TUBOMETER tests for quality, individual element leakage (both hot and cold); shorts, opens, noise and gas, all in accordance with highest engineering standards for emission testers.

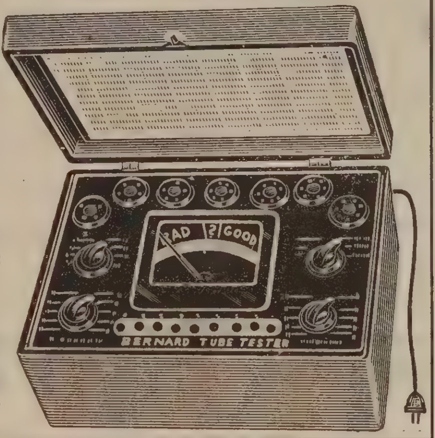
A line-voltage control is included. Individual switch control of all elements takes care of "floating filaments" and other non-standard tube arrangements. Extra socket facilities and other ample provisions guard against obsolescence.

Fast, accurate, simple, the Bernard Tube Tester uses no adapters.

Large 4½" square illuminated meter, with provision for external use of the meter alone (0-1 ma.).

Tests include all the old tubes, also all the new tubes, among them the new television tubes. e.g., 1851; the 1.4-volt 50 ma. and other battery tubes; gas tubes, such as 2A4G, OA4G, 884; ballasts, magic eyes, etc.

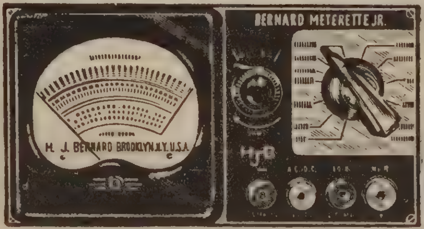
The impressive appearance inspires customer confidence; the rugged construction assures dependable service and long life. Attractive cabinet of solid instrument wood, with removable cover. Tubometer is equipped with carrying handle (not shown). Bernard super-accuracy prevails throughout. Model 387. Shipping weight, 11 lbs. Net price **$20.90**



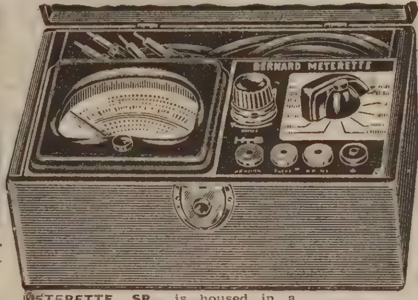
Counter Model, No. 387C, $19.90.

BERNARD SUPER-ACCURATE MINIATURES

5,000 OHMS PER VOLT D.C.


BERNARD METERETTE JR.
H. J. BERNARD BROOKLYN.N.Y.U.S.A.

World's lowest-priced 5,000-ohms-per-volter, **METERETTE JR.**, in open box, is a pocket-sized super-accurate micro-multimeter. It is the best switch-type pocket instrument made and the fastest seller. **Model 381-J**, shipping weight 3 lbs. **Net price** **$10.90**



METERETTE, SR., is housed in a handsome instrument wood cabinet and has removable hinged cover and test lead compartment. Leads included in price. Model 381-S, shipping weight 3 lbs. **Net price**...... **$13.90**

METERETTE is the outstanding 5,000-ohms-per-volter, providing super-accuracy and durability at lowest price. The junior model, 381-J, illustrated above (left), is housed in an open box of finished instrument wood, while the same chassis, when housed in a closed box, with removable hinged cover and compartment for the supplied test leads, constitutes METERETTE SENIOR, Model 381-S (at right). METERETTE is the first combination of super-accuracy, high sensitivity and low cost in a universal multimeter. A 3" square meter is used. Like all Bernard multimeters, it has only two controls, instead of the usual three, and separate selector switch positions for a.c., separate ones for d.c. The 3-volt battery (10c renewal cost) is self-contained.

14 RANGES

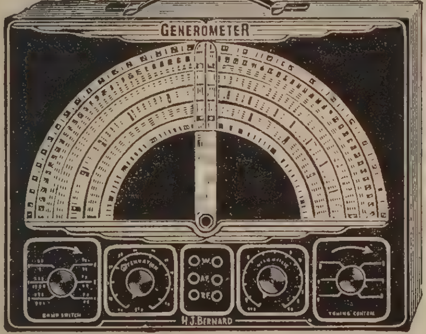
0-10-50-250-500-2,500 volts d.c., all at 5,000 ohms per volt. 0-10-100-1,000 milliamperes d.c. Also 0-200 microamperes d.c. 0-2,000 and 1,000-2,000,000 ohms. 0-10-100-1,000 volts a.c., all at 1,200 ohms per volt.

1000 OHMS PER VOLT D.C.

A 1,000-ohms-per-volt model, same appearance as METERETTE, is MINIMETER, with following fourteen ranges: 0-10 50 250-2,500 volts d.c.; 0-1-10-100-1,000 ma.; 0-400 ohms (100-ohm center), 0-250,000 ohms 0-10-100-1,000 volts a.c. Open box model, MINIMETER JR., Model 386-J, price $8.90.

SEE YOUR JOBBER OR WRITE FOR CATALOG "V."

TELEVISION SIGNAL GENERATOR



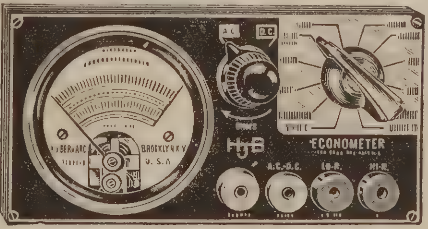
OPERATING entirely on fundamentals. **Generometer** is a signal generator covering 120 kc to 70 mc in six bands (down to 4.3 meters), by front-panel switch selection. Thus it supplies **all** the useful intermediate and radio frequencies for the complete alignment of all types of radio receivers. Future requirements are provided for by the inclusion of television bands.

The leakage has been eliminated, so that the attenuator works efficiently on all bands. By means of a switch, modulated or unmodulated carrier output may be selected. **Combines Low Price with the Perfection of Service Found Only in the Highest Priced Signal Generators.**
The dial is enormous—ELEVEN INCHES DIAMETER. Accuracy is 1% on i.f. and broadcast, 2% on short waves; 5% on ultra waves. Separate audio output.

SIX RANGES:

A. 120 kc to 380 kc	D. 4 mc to 12 mc
B. 380 kc to 1,100 kc	E. 12 mc to 50 mc
C. 1.1 mc to 4 mc	F. 25 mc to 70 mc

Generometer, Model 382, for 50-60 cycles, 90-130 volts a.c. Shipping weight, 12 lbs. Net price **$19.90**


A.C.
D.C.
H. J. BERNARD BROOKLYN N.Y. U.S.A.
HJB
ECONOMETER
A.C.-D.C.
LO-R.
HI-R.

1,000 OHMS PER VOLT D.C.

ECONOMETER is a miniature extraordinary. It really fits in your pocket. Despite lowest price it has super accuracy. A 2" meter (0-1 ma.) is used, with easy-to-read scale. Housed in attractive instrument cabinet.

14 RANGES

0-5-10-100-500 volts d.c., all at 1,000 ohms per volt.
0-5-10-100-500 volts a.c.
0-1-10-100-1000 ma. (up to one ampere).
0-400 ohms (50 ohm center);
300-325,000 ohms.

MODEL 383
$7.90

SUPER ACCURACY

Bernard instruments are the first and only highly-accurate ones in the lowest-priced field. All models in attractive cabinets of solid instrument wood with DeLuxe finish.

Lowest Priced But Priceless

BERNARD

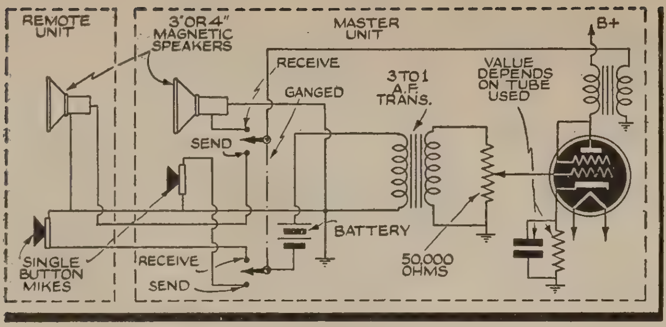
H. J. BERNARD   319-V THIRD AVENUE   BROOKLYN, N. Y.

Export Representative: Pan-Mar Corporation, 1270 Broadway, N. Y. City

FULLY GUARANTEED

Each Bernard instrument carries a card containing our guarantee. So far as we know, ours are the only guaranteed instruments in the lowest-priced field.

Question Box



Simple Two-way Intercommunicator—1161

Inter-Communication System

? *I wish to connect two single-button mikes and two small magnetic speakers in such a manner that inter-communication can be carried on between a room on a second floor in my home and the kitchen, which is on the lower floor. If possible, can you show by diagram the simplest way this may be accomplished?—H. A. Stebbins, Madison, Wisconsin.*

A. Here is a simple diagram using a stage of amplification for two mikes and two speakers. Both switches are located in the master unit, which may be used in either room. It is a simple affair and makes a satisfactory two-way communication system.

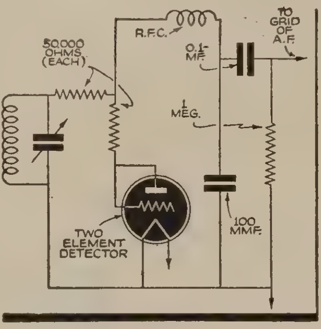
Set Squeals

? *Recently I have constructed a four-tube TRF, regenerative receiver. After adding an audio power stage, squealing and body capacity were experienced when the regeneration control was advanced. Can you suggest anything to remedy this?—Tony Piccolo, Ogdensburg, N. Y.*

A. The trouble you are experiencing is due to R.F. getting into the audio section. We suggest that you try placing a .002 mfd. condenser from the plate of the detector to ground or B minus. Refer also to diagram number 1131 in the June, 1938, issue of SHORT WAVE & TELEVISION. If this does not help, it would be best to change the complete layout of parts.

Two-Element Detector Circuit

? *I wish to use a two-element detector circuit in a receiver that I am constructing to cover the 2000 to 3000 kilocycle band. Could you supply such a detector circuit, giving the coil-condenser combination? I intend using two stages of tuned radio frequency amplification for local reception.—Nathan Lefkowitz, Lafayette, Indiana.*



Diode Detection—1162

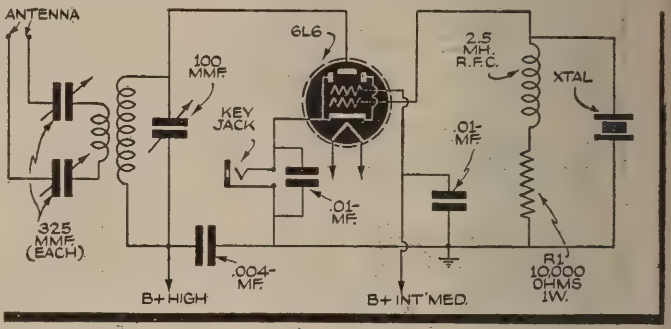
A. The sketch shown here illustrates a grid-leak two-element detector circuit. Either a D.C. filament tube or an A.C. heater tube may be used and as all common receiving tubes deliver about the same results, the choice will depend largely on the filament voltage supply available. The grid and plate of the tube are connected together as one terminal and the cathode or negative side of the filament serves as the other terminal. If a heater tube is used, it is well to bias the heater positively with respect to the cathode to prevent hum.

The condenser-coil combination in each tuned circuit will have about 37 microhenries inductance and may be made by winding 20 turns of No. 28 enameled wire on a 1½ inch diameter insulating tube. This is the tuned secondary. The condenser for this should be .00025 mf. The primary may be 20 turns of No. 30 enameled wire if screen grid tubes are used in the R.F. stages and 12 turns of the same size wire if three-element tubes are used. Ten turns of No. 32 enameled wire can be used for the input of the antenna coil. In each case the primary may be wound directly over one end of the secondary, with a layer of paper between both windings.

Two stages of R.F. amplification are usually recommended for local reception and three or even four stages for long distance.

Single Tube Ham Transmitter

? *I would like to construct a Ham transmitter using a single 6L6 tube, with crystal control. I have a power unit delivering the necessary voltages. Can you supply me with a list of parts, together with the diagram?—Adam Poretti, Bethesda, Maryland.*



Low Cost, Low Power Ham Transmitter—1163

A. Here is a diagram of a simple crystal control "Ham" transmitter using a 6L6 tube. All parts needed are shown in the sketch.

Treasure Locator

? *Can you inform an ardent reader of your magazine what issue of* SHORT WAVE & TELEVISION *contained an article on an Ore, Pipe and Treasure Locator?—Chas. Mecham, Fort Worth, Texas.*

A. An article on such a radio device appeared in the issue of May, 1937. Write our circulation department for a copy.

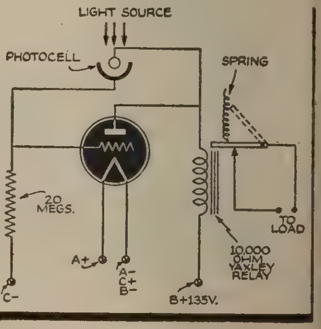
Data on 5 Meter Antennas

? *Do antennas for 5 meter work differ in any respect from the antennas that are used for 40, 80 and 160 meter work? How are they determined, and is there any book available in which one may secure some data with reference to the problems in designing such antennas especially for 5 meter or ultra-high frequency work?—Allen Johnson, Philadelphia, Pa.*

A. The problem of designing an antenna for the ultra-high frequencies in the neighborhood of 5 meters is in no respect any different from those used on the lower frequencies. Antenna lengths are determined in the same fashion, tuned feeders remain multiples of a quarter wave, and matching systems are treated in the same manner. Ultra-high frequency antennas are, of course, much smaller than their lower frequency counterparts and it is therefore more readily possible to observe their performance with a neon bulb or galvanometer.

Photocell Relay Circuit

? *In the October issue of* RADIO & TELEVISION *there appeared in the Question Box a diagram of a simple photocell relay circuit. I would like to obtain a more sensitive circuit, using a stage of amplification. I intend to use this for starting and stopping a motor. Can you give complete list of parts?—Alfred Barthy, Tampa, Fla.*



P-E Cell Circuit—1164

A. There is no reason why a stage of amplification cannot be used with a photocell. Here is a diagram for a photocell relay circuit which is slightly different from the one shown in the October issue, and which is suitable to operate a motor. The circuit shows the parts that are needed.

TECO TEST EQUIPMENT *Sold with a* GUARANTEE & 10 DAYS FREE TRIAL!!!

Buy direct from the factory. Save 50%. If the Instrument you buy does not meet your needs, return it for full credit on any other TECO equipment. Buy TECO and SAVE the difference!

NEW TECO TUBE TESTER

Model T-10 A genuine achievement! For accurate and rapid work. Has d'Arsonval moving coil meter. Tests all types of tubes. For use on 110 V., 60 cycle AC.

Features ● Tests all 4, 5, 6, 7s, 7L and octal base tubes. ● Tests by the well established emission method for tube quality, directly read on the Good ? Bad scale of the meter. ● Affords separate neon test for leakage and shorts between elements. ● All services performed with 5 controls at maximum—many tests not requiring all controls. ● Modern attractive etched panel housed in rugged leatherette carrying case with removable hinged cover and handle. ● 60 cycle AC operation. ● Supplied with instructions and reference table covering all tubes which you will commonly encounter in servicing. Size 11⅛ x 9½ x 5½". Net Price...... $11.75

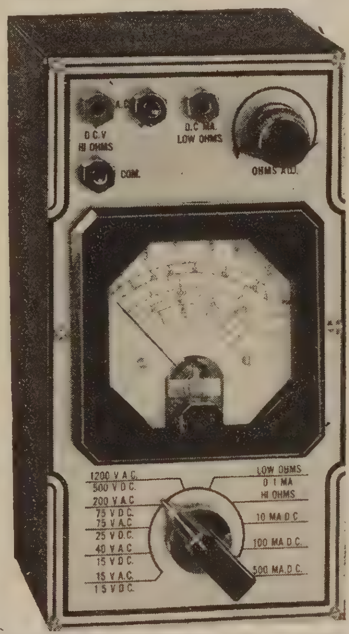
TECO POCK-O-METER
AC and DC

A new pocket size volt-ohm-milliammeter that includes AC measurements and is the lowest priced, full-service instrument ever offered! Has 3" d'Arsonval movement 0-1 milliammeter. Comes with etched panel.

SPECIFICATIONS

5 DC ranges: 0/1.5/15/25/75/500 volts.
5 AC ranges: 0/15/40/75/200/1200 volts.
4 DC current ranges: 0/1/10/100/500 ma.
2 resistance ranges: 0/500/500,000 ohms (low ohms read to 1 ohm)

Pock-O-Meter supplied complete with batteries, test leads, and instructions. Size 6½x3½x2½"; shipping weight 5 lbs. Our net price................ $8.45



NEW TECO MULTIMETER

MODEL T-15 Here's the unit you need for rapid, accurate measurements. A 1000 ohms per volt type instrument featuring d'Arsonval type movement 0-1 Milliammeter. Accuracy 2%. Attractive etched metal panel. For use on 110 V. 60 cycle AC. 2 RESISTANCE RANGES. 0-500 ohms, 500-5 megohms. HIGH AND LOW CAPACITY SCALES, .0005-1 mf. and .05-200 mf. COMPLETE AC and DC VOLTAGE and CURRENT RANGES. DC Voltage: 0-15, 0-150, 0-750 volts; AC Voltage: 0-15, 0-150, 0-750 volts; DC Current: 0-1, 0-15, 0-150, 0-750 ma.; AC Current: 0-15, 0-150, 0-750 ma. THREE DECIBEL RANGES. TECO Multimeter comes complete in carrying case with test prods and instructions. Size 11⅛x9⅛x5½". Shipping weight 8 lbs. Our net price $13.60

TECO TEST EQUIPMENT COMPANY *of America*
139 CEDAR STREET SW-12 NEW YORK, N. Y.

Local HAM Gossip

(Continued from page 471)

not been since he was W9LZO. He will come on, on 160 meter fone, and does some experimenting with a 5 meter rig.

Amateur Activity in Baltimore

● 3-AIB is back on the air with phone, operating on 14158 kc. 3-IK is still fooling with 56 megacycles. 3-FAM occasionally on 14 meg. 3-CBV works only foreigners on 14 meg. 3-FXU rebuilt and is on 10 meter phone. 3-HG working 10 meter phone. 3-CJH put up 2-sect. 8JK for 20 CW. 3-GNB a new one to be on 20 CW when LE finishes the rig. 3-CDZ says he will be on when he gets new receiver. 3-ASZ is back after an absence of about 5 years and is on 20 phone. 3-FWU is going to rebuild for 10 meter phone.

The 28 meg. band is really opening up here. And I understand that there are going to be about 18 new stations here with 1 KW rigs soon!

We expect a lot of new fellows to get licenses here in the very near future. Well, when I get the "final" hooked up and couple it to this 2-section 8JK beam I have up here, guess I won't have to worry much about it anyway. I have worked LU, VK, ON, OQ, VP, VS, XZ, VE-1, 2, 3, 4, 5, XT, T1, CO, HC, SU, VR, F, G, SV, W10, HH, K6, HA, VU, J, XE, CN, PA, PK, VO, YN, GI, KA, YR, GM, ZS, SM, HB, GW, and AC since last November with this 200 watts input. All worked on 20 meter phone. Totals are 28 zones and 43 countries compiled.—*Louis Charles Bremer,* W3LE, 130 So. Broadway, Baltimore, Md.

New York and Vicinity
W2CLS

● MET Laurence Cockaday, W2JCY, few weeks ago and he had just finished a new H.F. antenna which uses no insulation other than air and is working F.B. He will give the info to the gang soon in a magazine article.

"Ben" Franklin, W2GRG, on 20 has his new rotary beam working fine now and with his 1 *k.w.* behind it, it is going places. We had an opportunity to work many of the local gang, including W2AN, whom we used to work when he was W8AQZ in Ohio about 15 or more years ago. These local rag-chews are really worth while. Among the stations contacted were W2JZO, W2JIE, W2LEJ, W2CDL, W2JDS, W2GDP and W2KDS, all putting in fine signals.

Ten meters has been picking up somewhat, although not up to what it was a few months ago. Seems like a lot of old timers are working 10 steady and doing a good job. Included among them are W2AOG, W2AWC, W2TP, W2BMK and W2ISY.—*J. T. Wilcox,* 500-9th Street, Carlstadt, N. J.

Report from L. M. Funk, Fire Marshal of Dallas, Tex.

● THAT part of Dallas, lying west of the Trinity River, and known locally as Oak Cliff, is within itself a metropolitan city of 120 square miles area. This vast area of approximately 100,000 people was suddenly cut off from all means of communication from Dallas proper about 6:30 P.M. on Sunday, October 9, 1938 when a fire of unknown origin broke out.

The five fire stations in Oak Cliff were completely isolated from the headquarters station, and the citizens of Oak Cliff were unable to phone in alarms to headquarters.

Deputy Chief L. M. Long of the Dallas Fire Department, remembering that the Fire Marshal, L. M. Funk, numbered among his friends a host of amateurs, called on him for assistance. Together they contacted Bob Huffhines, W5OL, of Oak Cliff, who dug up an old 160 meter rock crusher.

The Fire Marshal then made another run to his residence and brought an amateur receiver to the Fire Department Headquarters, where he tuned in W5OL, and then through KVP, the Police & Fire Radio Station, two-way communication was resumed to the Oak Cliff area.

Directions and instructions were sent out from headquarters over KVP, and all of the Oak Cliff equipment and stations replied by telephone to W5OL, where Bob relayed the information to headquarters over his station. W5EQJ, Odis Peacock, assisted in keeping things in order.

This two-way communication was continued throughout the night, and just before day the workmen completed the repairs to the Fire Department lines, the emergency was declared ended and W5OL pulled the switch.

"73 Club" New York
W2DTT

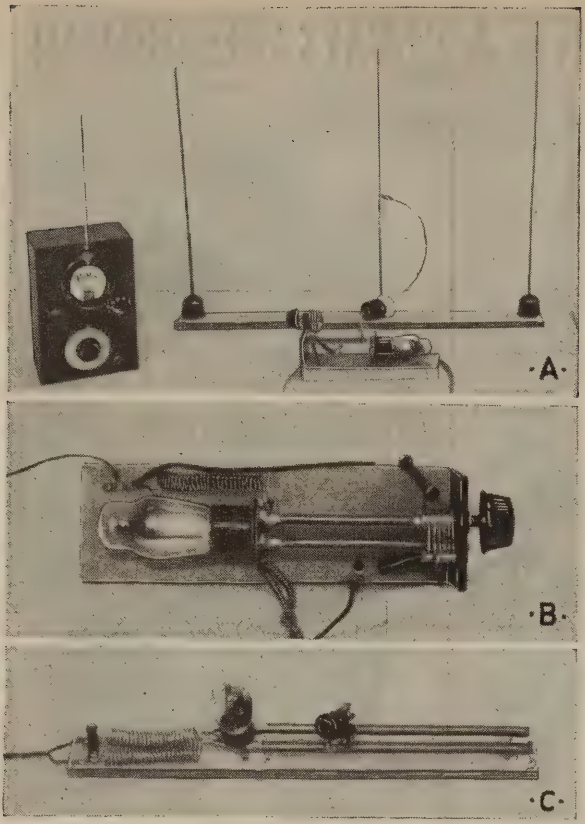
● THE "73 Club," one of the livest amateur radio clubs in the metropolitan area of New York, is laying plans for what promises to be a very successful season.

If you 20 meter phone "hams" haven't contacted Miss Ruth Feldman, who daily operates W2ASA, as yet, do so, for this "gal" just disseminates oodles plus of personality and interest. —*Alvin Abrams,* W2DTT.

1-Meter Waves with Ordinary Tubes

Nelson G. Haas and Carl A. Erbacher

Ultra-high frequencies are attained by using such standard tubes as the 27, 37, 56, or 76, in conjunction with old parts, found in any workshop.



A—Antenna system for 1-meter oscillator consists of antenna, reflector and director. Output meter is placed in beam. B—The completed 1-meter oscillator. Note simple layout. C—Another neat layout. Using a 45, 71 or 210, this rig afforded more power, but would go only to 1.6 meters.

● VACUUM tube oscillators on a frequency of 224 million cycles per second, antennas less than a foot in length, radio signals carrying speech or music steered and bent around corners, much as beams of light would be—these are the interesting characteristics of a band of ultra-high frequency waves that can be generated with the simplest circuits and the most common varieties of tubes—the wavelengths around one meter!

Useful radio waves, the length of which can be measured by a yardstick, aimed in the exact direction one wants, to a receiver beyond the optical range; the entire apparatus, including the already assembled antenna arrays, can be packed into a fair sized soap box. In the many years the writers have been engaged in the radio game, building, testing and operating their own stations, never have they encountered a phase of radio half so fascinating, or nearly so instructive a laboratory test for the development of equipment such as oscillator circuits and antenna—receiver performances, dielectrics, etc.

For instance, it is but the work of minutes to set up an experimental antenna array and take field strength readings when the antenna can be measured with a 12-inch ruler. And the most convenient part is that all the apparatus needed is readily available, since it is the same type parts used in constructing higher wave equipment. But little room is needed for this sort of work, a desk top offers ample space for transmitter, antennas and a receiver.

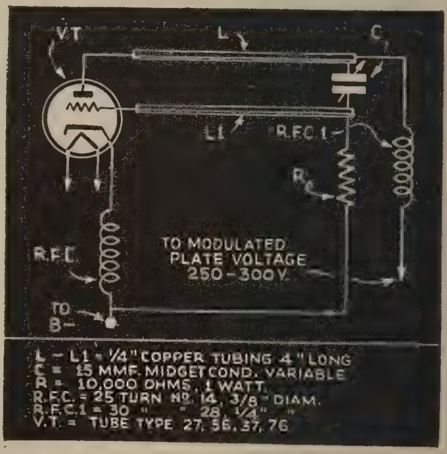
The first radio waves generated by that eminent physicist, Heinrich Hertz, in 1887, were in the region of from one to five meters. Marconi, seeking a practical development of Hertzian waves, turned to the more readily used wavelengths above 300 meters for his first experiments. The phenomenal success at these wavelengths focused the eyes of all experimenters for many years on the longer lengths so that, until a few decades ago, nothing more was known of the very short, or Hertzian, waves than was known at the conclusion of those early experiments by the man who gave his name to them.

For a long period following a return of interest in Hertzian waves, scientists found no particular use for them, and their characteristics remained an abstract proposition—something to know about, and nothing more. The advent of the acorn and the door knob type tube a few years ago reawakened the experimenter's interest in Hertzian waves but did little else—for he immediately bumped into the stone wall of far-too-expensive equipment.

But from the commercial laboratories, with their theory-trained workers, their resources of specially designed tubes and associated equipment, have come some interesting circuits and results. It is these circuits and accomplishments that the writers have endeavored to utilize by incorporating the most salient features with the usual ham, or amateur, practices, at the same time keeping to the reputedly less efficient older and far cheaper types of tubes and dielectrics. The results have been more than satisfactory to us so we pass them along to the reader, the man who is tiring of the commonplace in radio and who wants to delve into the last unexplored frontier of radio development.

A line to caution the too-enthusiastic experimenter seeking unusual or startling results. The powers generated by the tubes specified in this article, while ample for observation and communication, are comparatively minute. Should one have the urge to use larger tubes and higher powers, be careful in the applications the outputs are applied to!

The human body resonates as a half wave, at about 3½ meters, as a full wave at 1¾ meters and as two full waves at a little under one meter. Which means that with a 15 or 20 watt oscillator, even on 3½ meters, the body will, under favorable conditions, resonate sufficiently so that a second person can light a small neon lamp on one's nose or ears, or toes, points of maximum voltage. Exposure to more power than this would very likely raise the internal temperature of the body and, if sufficiently powerful, destroy the body cells. So best stick to the apparatus described until one becomes thoroughly familiar with the characteristics of the waves around one meter!



L - L1 = 1/4" COPPER TUBING 4" LONG
C = 15 MMF. MIDGET COND. VARIABLE
R = 10,000 OHMS, 1 WATT.
R.F.C. = 25 TURN Nº 14, 3/8" DIAM.
R.F.C.1 = 30 " " 28 1/4" "
V.T. = TUBE TYPE 27, 56, 37, 76

Schematic diagram and list of parts used in constructing the 1-meter oscillator, utilizing standard receiving tubes.

Having decided to adopt modern laboratory practices now used in ultra-high frequency work to equipment readily available to the average experimenter, the writers lost little time in finding which of the many possible circuits would prove the most suitable. All the basic oscillating circuits previously used in commercial laboratory circuits were quickly wired up and tried. Comparison showed that only one, the split-Colpitts, or ultra-audion oscillator, approached a satisfactory standard when using ordinary triode tubes. The ultra-audion circuit chosen discards the familiar coil and condenser combination, used to obtain resonance, and—borrowing laboratory technique—uses instead *resonant "long lines"* made of tubing to tune both the plate and grid circuits.

The tubes at first were of the receiver UX audio output type, such as 171s, 112s and finally, in an attempt to increase power, 245s. All these tubes oscillated without any coaxing on waves as short as 1.6 meters. While using these tubes we discovered that they handled much the same as they would on 5 meters, insofar as output was concerned.

For checking wavelength, a simple version of a Lecher wire system was used. This comprised a 6-foot length of 1 x 2 inch lath to which were nailed 2 lengths of bare No. 14 copper wire, terminating at one end in a U-shaped loop and left open at the other end. A flash-light bulb and socket, to which were fastened 2 clips on very short leads, made up the "bridge" to short the wires and so get a possible reading.

To determine the wavelength the loop of the Lecher wires is placed in close proximity to the transmitter and the *bridge* is slid along the wires, starting at the loop end, until it indicates the maximum current point by the flashlight bulb lighting most brightly. From that point on the wires to the loop should be exactly half a wavelength, and can be measured off with a ruler, allowing, of course, 39.37 inches to the meter, so as to get the wavelength in meters.

An antenna cut to resonance and having a flashlight bulb in its center gave some indication of output that could be used for comparison, but a field-strength meter, such as the writers described in May, 1938, SHORT WAVE & TELEVISION as a crystal rectifier unit, proved invaluable for making field-strength measurements.

The super-regenerative receiver we used tuned down, when checked by Lecher wires, to ¾ meter and the detector tube in it, a 56, oscillated smoothly at that short wavelength. The cylindrical plate in a tube of the type such as the 56, 27 or 37, insures a far lower grid-plate capacity than is found in the type tubes first used in the transmitter.

The transmitter shown in the accompanying photograph was then constructed. Its details can be readily ascertained by studying both the photograph and the diagram. From the start it was successful beyond our expectations. In wavelength it would tune down to about ¾ of a meter, all the while running cool and stable. In fact, the signal from this transmitter, when tuned in on the super-regenerative receiver, stayed in one place on the dial for hours of constant checking. The 56s in both receiver and transmitter, neither of which were being operated at more than 200 volts, did not drift enough to necessitate retuning the receiver. This on one meter, without the aid of special tubes and equipment usually believed necessary for successful operation on that wavelength!

(Next article covers receiver)

Radio Talks from Jungle

(Continued from page 466)

manipulate the dials. It finally dawned on her that the voice was coming out of the radio apparatus."

The greatest curse of tropical radio, according to Hungerford, was the insect. The nightly yield of electrocuted bugs averaged one quart.

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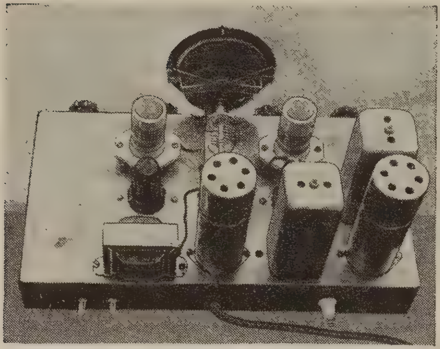
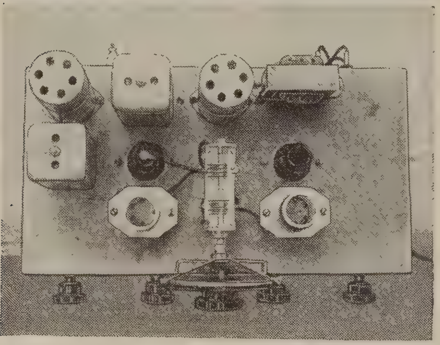
How to Build the W8KPX BEGINNER'S HAM Receiver

Harry D. Hooton, W8KPX

High in efficiency, low in cost, this Selective and Sensitive 4-tube Ham set affords band spread on Five Bands.





Top: A rear view of the W8KPX Special. Below: Top view, showing layout of parts.

● SINCE the publication of the "W8KPX" Beginner's Transmitter article in the July, 1938, issue of RADIO & TELEVISION, the author has received a number of requests from Ham beginners and would-be Hams for constructional data on a companion Beginner's Ham Receiver. In each case the writer specified a set capable of efficient five-band operation, with plenty of *sensitivity, selectivity* and *band-spread*, easy to build and operate and, finally, of the lowest cost consistent with the desired results.

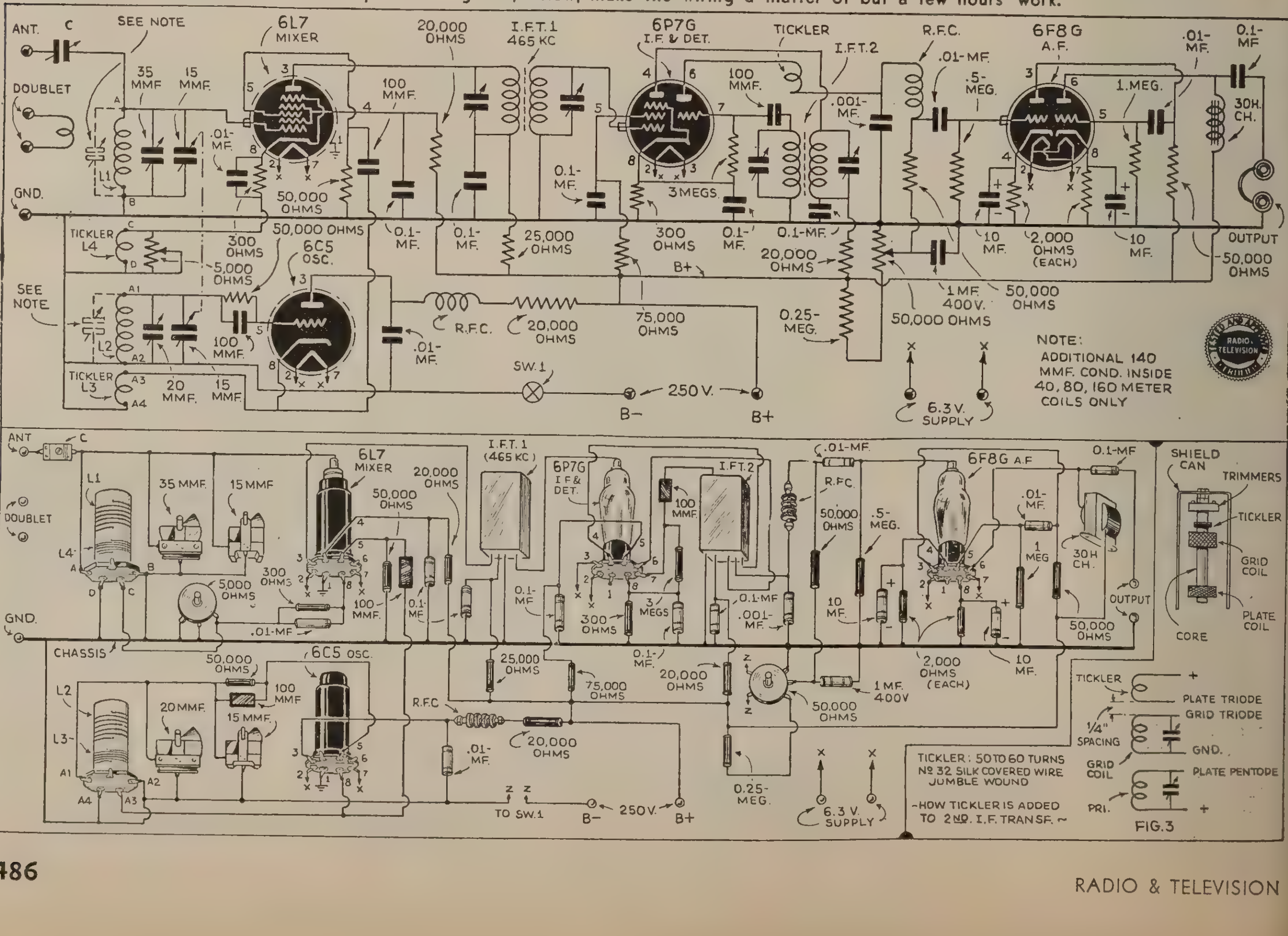
4 Tubes Do the Work

The little 4-tube dual-regenerative superhet to be described here has been designed especially for use with the 75-watt transmitter, and is ideal for either the newcomer or the dyed-in-the-wool "old-timer" who wishes only a simple, low-cost receiver.

As the diagram, Fig. 1, shows, the circuit has been worked out around the new 6P7G pentode-triode and 6F8G dual-triode tubes, with regeneration in both the R.F. and I.F. circuits. Using only two metal and two glass tubes, the results, so far as sensitivity, image frequency rejection and selectivity are concerned, are actually better than those obtained from most 6- or 8-tube receivers using the conventional superheterodyne circuits. Briefly, the line-up consists of a 6L7 regenerative mixer, a 6C5 high-frequency oscillator, a 6P7G as I.F. amplifier and regenerative detector and a 6F8G as two stages of resistance-capacity coupled A.F. amplification. The iron-core, 465 kc., I.F. transformers give an appreciable increase in gain over the ordinary air-core types. *Regeneration* is introduced into the mixer circuit by means of a few turns of "tickler" winding in series with the 6L7 cathode and coupled to the "cold" end of the mixer grid coil. The regeneration control for this circuit consists of a 5,000 ohm potentiometer shunted across the cathode coil. It is

(Continued on opposite page)

Schematic and picture diagrams, below, make the wiring a matter of but a few hours' work.



If you order any of the sets described below NOW, we will guarantee that your set will reach you in time for the holidays. *We built up a stock* to take care of rush orders. *Act promptly.*

THE NEW AND IMPROVED

DOERLE MODEL D-38

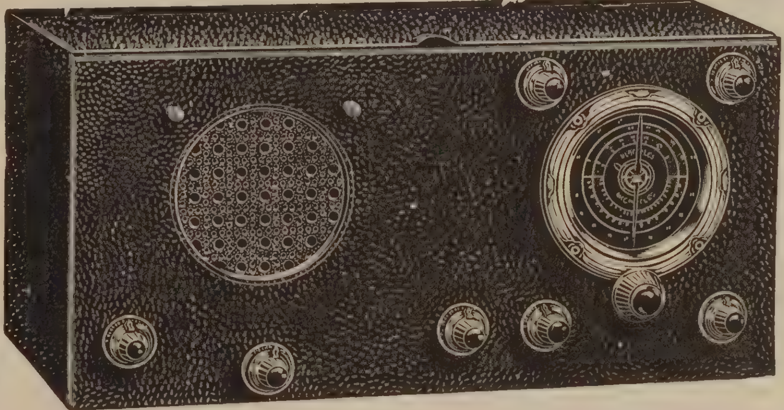
A. C. 17½ x 8½ x 8½
7 Tubes 4½ to 3000 Meters

The last word in short wave receivers. Before you buy send for circular D-38, an eight-page booklet containing schematic and picture diagrams, instructions, and sketches.

Read this booklet and compare with the other models you have in mind. Then send your order to the concern who in your opinion is giving you the best for your money.

Complete, with all coils, and tubes, no extras **$32.50**

Kit, factory assembled, but unwired, less tubes, with all coils **$22.50**



7C 5-Tube

Short Wave Receiver 8¼ to 625 meters

Bigger and More Powerful Than Ever

A Giant in Performance

Our Model 7C, A Midget in Size—A Giant in Performance. One of our most popular short wave receivers.

Our files contain many letters from satisfied listeners from all over the world which testify to the popularity of this set, and their lists of DX stations received on the loudspeaker is amazing.
Uses a 6K7 radio-frequency stage, a 6F7, twin 2 in 1 tube, as regenerative detector and first audio, one 6C5, one 12A7, twin 2 in 1 tube, and one K92A.

Earphone pack has been incorporated to permit the use of phone when loudspeaker operation is not desired. Operates from regular house current.

Size: 10x7½x7½.

Complete with all coils, 9½ to 600 meters, and all tubes, ready to use, nothing else to buy **$16.50**

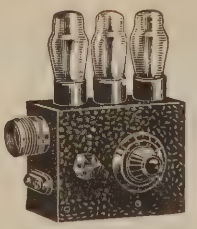
In Kit form, but factory assembled, including all coils and tubes, but unwired **$12.95**

*Available in battery model upon special order at same price.

**Also available in ham model with special tuning circuit to provide additional bandspread at $1.00 additional.

BS-5 Six tube Bandswitch Receiver, no plug-in-coils, select the band by a simple flip of the switch.
Loudspeaker Operation
12 to 600 meters, automatic headphone jack also included.
Complete, ready to use, including tubes, factory wired and laboratory tested, $18.50.
Complete kit, factory assembled, ready to wire, including tubes and cabinet, $16.50.

3 Tube Electric Model, complete, tested and ready to use, with 5 plug-in coils, 12 to 600 meters, at $6.50.



Kit form, factory assembled, but unwired, with coils, less tubes, $3.50.
Available in battery model at same prices, if specified. If tubes are desired, add $1.50.

FLASH! SEND 10C FOR OUR NEW CATALOG containing CIRCUIT DIAGRAMS, and complete information on over 25 different types of short wave receivers and transmitters from $2.50 and up. This catalog is chock full of schematic and picture diagrams, hook ups and short wave information. A book in itself. Well worth the dime, which will be refunded with your first order.

OSCAR B. KUSTERMAN 68 Barclay Street, Dept. 12
:: New York City ::

necessary to re-vamp the output I.F. transformer, adding a small tickler winding as shown in Fig. 3. Regeneration in the second detector is controlled by varying the voltage applied to the triode plate of the 6P7G tube by means of the 50,000 ohm potentiometer connected across a portion of the "B" supply.

The 10 meter amateur band to occupy approximately 50 degrees on the 270 degree dial. On the lower frequency bands, the band-spread increases as the frequency is lowered, until the full 270 degree scale is utilized on 160 meters. On the 10 and 20 meter bands the coils are wound on midget 1-inch isolantite forms, and the band-setting condensers consist of the 20 and 35 mmf. units whose knobs show just below the tuning dial in the photographs. The 40, 80 and 160 meter coils are wound on the standard, 5-prong forms and carry their own band-setting condensers *inside* the forms.

Adjust the mixer regeneration control to a point about one-half way on and turn up the potentiometer in the second detector plate circuit until a slight hissing sound is heard in the phones. Set the tuning dial at half scale. Connect the antenna and ground wires and, with a small *insulated* screwdriver, adjust the band-setting condenser inside the oscillator coil to the approximate center of the band. Adjust the mixer band-setter for maximum signal strength, rotating the mixer regeneration control back and forth to obtain the most satisfactory setting. Pick out a good steady, *weak* signal, tuning it in as accurately as possible, and adjust the screws in each I.F. transformer for the greatest gain or signal strength. Go over the trimmers several times in order to obtain accurate alignment.

Either a plain single wire or a doublet antenna may be used with the receiver. A single wire, well insulated and in the clear, 20 to 50 feet long, will be satisfactory for all bands. However, on 10 and 20 meters a doublet will probably be better.

Coil Data

Mixer Coils

Grid Coil	*Spacing*	*Tickler*	*Wire*	*Band*
4 turns	1"	3 turns	20 enam.	10 meters
12 turns	1½"	4 turns	20 enam.	20 meters
17 turns	1¾"	6 turns	22 enam.	40 meters
35 turns	1¾"	9 turns	26 enam.	80 meters
58 turns	1¾"	14 turns	28 enam.	160 meters

Oscillator Coils

Grid Coil	*Spacing*	*Tickler*	*Wire*	*Band*
4 turns	1"	4 turns	20 enam.	10 meters
12 turns	1½"	4 turns	20 enam.	20 meters
15 turns	1½"	6 turns	22 enam.	40 meters
32 turns	1¾"	9 turns	26 enam.	80 meters
52 turns	1¾"	16 turns	28 enam.	160 meters

The 10- and 20-meter coils are wound on 1" forms; the 40-, 80- and 160-meter coils are wound on 1½" forms. Spacing refers to length of winding on the form, not the distance between turns.

Parts List

HAMMARLUND

1—2-gang tuning condenser, 15 mmf. per section
1—Single tuning condenser, 35 mmf.
1—Single tuning condenser, 20 mmf.
6—"Air-padding" condensers, 140 mmf. each
6—XP-53 coil forms, 5-prong type
2—Midget R.F. chokes, 2.5 millihenry
2—Iron-core I.F. transformers, 465 kc. (one input and one output)
4—Midget isolantite coil forms, 5-prong type
2—Isolanite sockets, 5-prong type
4—Isolantite sockets, 8-prong type
1—Midget trimmer condenser, 3-30 mmf.
2—Aluminum tube shields

SPRAGUE (Condensers)

6—Paper condensers, 0.1 mf., 600 volts
4—Paper condensers, 0.01 mf., 600 volts
1—Paper condenser, 1.0 mf., 400 volts
1—Dual electrolytic condenser, 10-10 mf., 50 volts
3—Mica condensers, 0.0001 mf.
1—Mica condenser, 0.001 mf.

(Continued on following page)

H. G. CISIN'S FAMOUS KITS

1939

SPACE EXPLORER

All-Wave All Electric (A. C.-D. C.) 4-Tube Receiver

SEVEN BANDS—10 to 2000 meters. Professional Band Spread Communication Set.

Powerful, Sensitive and Selective. Full loud speaker volume. Reception from as many as 39 foreign stations in a single evening reported and verified by many owners.

Uses one 6C6, one 76, one 12-A-7 (Twin-Tube) and one Metal K105-A; as regenerative detector, powerful two-stage pentode audio amplifier, half-wave rectifier and automatic ballast stage. Self-contained power supply operates on 105-120 volts, any frequency a.c. or d.c. interchangeably. Built-in chromatic speaker phone jack, antenna control, full-vision airplane type dial, band spread variable, dual regeneration control, sturdy metal chassis. Clear explanatory diagram simplifies wiring.

Complete Kit of All Chassis Parts, Power Supply and Diagram (unwired, less tubes, coils and speaker) **$4.95**

Wired and Tested $1.50 extra. Four Matched Tubes, $2.45. Four S.W. Coils 10 to 200 Meters $1. 2 B'cast Coils, 200-550 m. $1. Long Wave Coil 550 to 2000 Meters $1. Tru-Fidelity Chromatic Speaker $1.45.

H. G. CISIN'S All-Wave Air Scout Jr. Radios

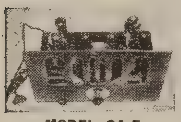
THREE-TUBE

ALL ELECTRIC ALL WAVE SET

MODEL 3A-E

$3.20 WITH PHONE Less Tubes Unwired

A powerful sensitive all-wave set. Holds wonderful records for **foreign reception.** Also brings in police calls, amateur, code, Transatlantic phone and broadcast entertainment. Excellent volume. Works from any A.C. or D.C. house current. Easiest set to build. Employs newest metal ballast tube as one of the tubes. Speaker mounts on attractive panel. Range 9½ to 610 meters or to 1500 meters with special long wave coil. **Complete Kit** includes: Earphone, broadcast coil, 70 to 200 meter coil. Panel, Chassis, High Grade Variabie Condenser, Potentiometer, Antenna Trimmer. Dial, Sockets, Knobs, Wire, Resistors, Condensers, and all other required parts including instructions and diagram. ONLY .... **$3.20** With Phone (Less tubes, unwired)



MODEL 3A-E
Pat. No. 2,086,256

ONE-TUBE BATTERY SET—Model 1B. Satisfied owners report **MARVELOUS FOREIGN RECEPTION.** Also other S.W. and broadcast reception same as model 3 A-E. Earphone reception. Complete kit includes parts listed above plus 30 tube and filament rheostat. Uses inexpensive batteries .... **$2.45** With Tube and Phone (unwired)

TWO-TUBE BATTERY SETS—Model 2B. Complete kit including all parts in the 1-tube model plus parts for extra audio stage including power tube .... **$2.95** With Two Tubes & Phone (unwired)

THREE-TUBE DE LUXE BATTERY SET—Model 3B. Complete kit including all parts in the 1-tube model plus parts for two extra audio stages including two 31-type tubes and 33 power output tube .... **$3.45** With Three Tubes & Phone (unwired)

Following Auxiliary Parts are available: 9½ to 20 meter coil 25c; 15 to 45 meter coil (foreign) 25c; 40 to 80 meter coil (foreign) 25c; 22½ volt "B" battery 75c; Two flashlight "A" batteries 10c each; 5" Find-all Loud Speaker $1; Complete Antenna Kit 50c; Wood Screw Kit 10c. Tubes for Model 3A-E each 35c. Long Wave Unit and coil for any model $1. Double Earphones $1.30. Bandspread Attachment 75c. Any Air Scout Jr. model wired extra $1.00.
NOTE: If you already have earphones, two extra **foreign** coils may be substituted in any model. flashlight cells.

AIR WAVE AIR SCOUT

1 TUBE 3-IN-1 KIT

$1.00 *Less Tube Unwired*

All **three** types of reception with this remarkable, low-priced set, merely by interchanging plug-in coils. Coil included in kit brings in Broadcasting, Police Alarms and other interesting short wave programs. Five other coils available to cover 5 different wave bands. **FOREIGN RECEPTION** under suitable conditions. Three foreign coils 25c ea. extra. Upper broadcast band coil 50c. Long Wave unit and coil 75c. Designed for earphones, but operates loud speaker on strong stations. Works with any battery-type tube. Uses inexpensive batteries. Dry cell tube (50c) requires 1 or 2 flashlight cells and small "B" battery. 5-volt tube (25c) substitutes storage battery for flashlight cells.
Kit comes complete with black mounting panel, coil, all necessary parts, detailed instructions and amazing new full sized picture guide which fastens under panel showing exactly where to mount parts and fasten wire.

H. G. CISIN, CHIEF ENGINEER
Allied Engineering Institute, Dept. S-50
98 Park Place, New York, N. Y.

Build this 4-Tube HAM Receiver

(Continued from preceding page)

BRUSH
1—Pair crystal headphones

RCA (Tubes)
1—6L7 (metal)
1—6C5 (metal)
1—6P7G (glass)
1—6F8G (glass)

CENTRALAB (Resistors)
1—Volume control, 5,000 ohms
1—Volume control, 50,000 ohms with SPST switch
3—Fixed resistors, 1 watt, 50,000 ohms
3—Fixed resistors, 1 watt, 20,000 ohms
1—Fixed resistor, 1 watt, 25,000 ohms
2—Fixed resistors, 1 watt, 300 ohms
2—Fixed resistors, 2 watts, 2,000 ohms
1—Fixed resistor, 2 watts, ¼ megohm
1—Fixed resistor, 2 watts, 75,000 ohms
1—Fixed resistor, ¼ watt, 50,000 ohms
1—Fixed resistor, ¼ watt, 0.5 megohm
1—Fixed resistor, ¼ watt, 1 megohm
1—Fixed resistor, ¼ watt, 3 megohms

CROWE
1—Dial (Micrometer type, 270 degrees)

MISCELLANEOUS
1—Filter choke, 50 ma., 30 henry
4—Pointer knobs
1—Steel chassis, 7 x 13 x 2 inches

S. W. League

(Continued from page 470)

Lester Fuller, Jr.—Observer for Arizona

Call	Freq.	R	S	Call	Freq.	R	S
KA1ZL	14.070	4	7	PK6XX	14.020	5	8
KA1JM	14.075	4	7	PK2AY	14.250	3	5
KA1KK	14.075	3	5	CN1AF	14.080	3	5
VK5MF	14.—	4	6	ZS5AW	14.080	4	7
VK4BJ	14.—	7	8	VK2NS	14.000	5	8

Romney Miller—Observer for Rhode Island

Call	Freq.	R	S	Call	Freq.	R	S
ZL2BE	14.10	5	7	VS6AG	14.08	5	6
KA7EF	14.15	5	6	J2MI	14.10	5	6
VK2NS	14.02	5	8	J2NF	14.05	5	8
VK3EH	14.05	5	7	NY2AE	14.25	5	8
VP2LB	14.13	5	7	ZS5AW	14.08	5	7
SM7YA	14.07	5	8	ZS6AJ	14.015	5	9

Ed. Davenport—Observer for Vermont

Call	Freq.	R	S	Call	Freq.	R	S
VP2LC	14.13	5	7	VP7NS	14.17	5	4

Bob Taglauer—Observer for Kentucky

Call	Freq.	R	S	Call	Freq.	R	S
VR6AY	14.350	3	4	VK2GU	28.150	5	8
ZL2DE	14.150	4	6	PA0FB	28.180	5	7
VK2NS	14.020	5	7	G5VM	28.185	5	8
VK4VD	14.145	5	8	G5LJ	28.180	5	8
VP7NU	14.045	5	7	G5SI	28.150	5	6
VP7NS	14.075	5	8	G2ZV	28.190	5	6
VP6FO	14.085	5	7	G2VM	28.190	5	7
VP1BA	14.115	5	9	G8SA	28.105	5	9

Bill Henderson—Observer for Arkansas

Call	Freq.	R	S	Call	Freq.	R	S
VK2NS	14.02	5	8	VK3VW	14.03	5	6
VK4JP	14.30	5	9	PK6XX	14.20	5	9

Jack Wells—Observer for Alabama

Call	Freq.	R	S	Call	Freq.	R	S
VO1I	14.11	5	7	PK1VY	14.08	5	8
KA1ZL	14.26	4	5	PK6XX	14.009	5	7
VR6AY	14.345	5	5	CN8AV	14.12	5	7
K5AH	14.26	5	7	CN1AF	14.278	5	8
NY2AE	14.20	5	8	VP7NS	14.09	5	8
ZB1L	14.14	5	5	SV1KE	14.00	4	7
PA0EO	14.135	5	7	ZL2BE	14.215	5	6
FA3HC	14.04	5	6	VK2ABD	14.515	5	6
EA9AH	13.99	5	9	TG5	14.05	5	7

From Observer Wells I have learned the QRA of CN1AF. Address reports to this station as follows: Sr. Jose M. Sierra—19, Rue des Sources, Tangier Zone, North Africa.

R. A. Rush—Observer for California

Call	Freq.	R	S	Call	Freq.	R	S
VK2GU	28.420	5	9	VR6AY	14.348	5	7
ZL3KZ	28.400	5	6	PK6XX	14.020	4	7
HI7G	28.450	5	7				

Ray Halliday—Observer for South Carolina

Call	Freq.	R	S	Call	Freq.	R	S
K6LB	28.262	5	7	YV1AQ	28.276	5	6
HI7G	28.270	5	8	K4EJG	28.075	5	9
G6BW	28.268	5	5				

Roger Legge, Jr.—Observer for New York

Call	Freq.	R	S	Call	Freq.	R	S
ZL2BE	28.4	5	7	KA1FH	14.27	4	5
ZL2BT	28.35	5	7	KA1CS	14.294	4	5
ZL3BV	28.3	5	7	KA1HS	14.29	4	5
VK2GU	28.3	5	7	PK1VY	14.28	5	7
ZS1AX	28.35	5	6	VK7RZ	14.3	4	6
ZS6ED	28.1	5	7	SU1AX	14.03	5	7
ZS6DW	28.	5	7	ZS5AB	14.3	4	6
FA3JY	28.3	5	6	CN1AF	14.278	5	7
CN8AV	28.3	5	8	ZB1L	14.14	5	6
SU1RO	28.1	4	5	CX2CO	14.01	4	6
TG9AA	28.3	5	7				

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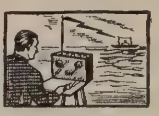

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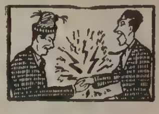

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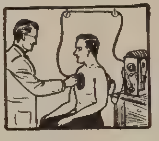

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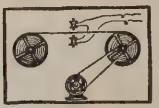

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Let's Listen In

(*Continued from page* 475)

wave, we heard an R5-6 "sig," with a rapid flutter, reply to FTM *"—ici Saigon, allo—."*

FZR, on 16.25 mc., used to be a stand-by at 8:30 a.m., but we have not heard it lately.

It would be a good bet to try FZR, at 8:30 a.m., but begin looking for it at 7 a.m., from which time it has been heard. However, FZR usually works FTK, 15.88 mc., also at St. Assise. Watch FTK daily, a very powerful "sig," and if you hear speech, try for FZR, which puts in a very nice "sig" here, often R7-8.

For these stations, write to Centre Radioelectrique de Saigon, Postale Boite 238, Saigon, French Indo-China, and you'll earn a very courteous veri.

JAPAN

A new sw broadcast signal from Japan is being very well heard mornings, in conjunction with JVN, on 10.66 mc. This new transmitter operates on 9.73 mc., and is almost as good as JVN. It is listed as *on the air* from 1:50 a.m. on, or same schedule as JVN. Check the sig with JVN's. Both carry same program.

A new one reported lately is JZO, 10.27 mc., at Tokyo, heard almost daily from 8:30-9:30 a.m.

The Jap phones are having a busy time of it, as, despite our very limited time spent in DXing a.m.'s, we've heard 'em very often.

JVF, 15.62 mc., heard at 1:15 a.m. and 5:45 p.m. JVE, 15.66 mc., heard at 3:55 a.m., also 1:15 a.m. JVH, 14.60 mc., 4:25 a.m. and 5:55 p.m. JVA, 18.91 mc., at 7:05 a.m., and JIB, 10.535 mc., at Taiwan (Formosa), heard phoning at 5:45 a.m. This last, a new country distinct from Japan, is also often heard carrying musical programs in a.m. JIB verifies from same QRA (address) as all Jap-phones.

NEW CALEDONIA

"Radio Noumea," on 6.12 mc., has lately been heard signing FK8AA, the call of an amateur there.

The schedule is now Tues. and Sats., 2:30-3:30 a.m., so look for this one, a real DX catch for anyone's "log." QRA is Charles Gaveau, FK8AA, 44 Rue de L'Alma, Noumea, New Caledonia.

PHILIPPINES

KZGH, at Iloilo, has QSL'd to Ashley Walcott, with a courteous letter from Francisco Blanco, the station supervisor. Veri states transmitter is in operation daily from 6 p.m.-10 a.m., E.S.T., in connection with local 2-wire telephones. 400 watts are used, freqs. changed by a dialing system. Five different freqs. are used, those mentioned being 6.755, 5.445, and 2.73 mc.

NEW GUINEA

VHSU, at Salamaua, was logged testing with an unidentified VHU4, one morning from 5:30-8 a.m., using 3 freqs. This also from Ashley Walcott, W6. On 8.07 and 6.54 mc.

JAVA

PLP, 11 mc., and PMN, 10.26 mc., are really "rolling in" here, an R8-9 "sig" many mornings! PLE, 18.80 mc. (all three at Bandoeng), logged by G. C. Gallagher, phoning Tokyo at 2 a.m. and 9:20 a.m.

YDA, 6.04 mc., Bandoeng, is now relaying PLP's programs from 7-10 a.m. irregularly.

CHINA

China is using her transmitters very often of late, normal, considering conditions.

XTR, 9.40 mc., now at Chungking, is a frequently heard signal, from 6-7 a.m., or later. with a very powerful signal.

XTS, 11.44 mc., at Chungking, contacts XTJ, at Hankow, on 11.69 mc., almost any time of a.m.; lately at 5:15 a.m. One a.m. we heard XTS change over to XTR, probably for a better contact with Hankow. This happened at 5 a.m.

DX REVIEW

FED. MALAY STATES—ZGB, 13.63 mc., Kuala Lumpur, heard lately at 6:50 a.m., with a very fine signal.

SIAM—HSP, 17.74 mc., Bangkok, logged by G. C. Gallagher, at 2 a.m. and 10 a.m., quite regularly.

MANCHUKUO—TDD, 5.83 mc., Shinkyo, heard phoning at 7 a.m., also TDE, 10.065 mc., at 7 a.m. TDE is to be heard at all hours of a.m., contacting and phoning with JVO, 10.37 mc., Tokyo. G. C. Gallagher, W6, contributes this item. Also JDY, 9.93 mc., usually a broadcaster phoning at 9:20 a.m.

FORMOSA—JLB, 10.535 mc., Taiwan, relays JFAK, broadcast band transmitter, daily, 9:05-9:55 a.m. Gives news in English and Japanese. Same program on JFO, 9.636 mc., which operates from 4-10:30 a.m. This from OM Gallagher.

INDO-CHINA—Radio Philco, at Saigon, reported on 6.21, 9.72, and 11.71 mc., at 7:30 a.m. by OM Gallagher.

CHINA—XGJ, 11.68 mc., Hankow, *"The Voice of China,"* broadcasting schedule 7-7:30 a.m.

XGOW, 9.30 mc., Shanghai, broadcasting 7:30 a.m. and heard shifting to 9.19 mc. From G. C. Gallagher.

(*Continued on page* 509)

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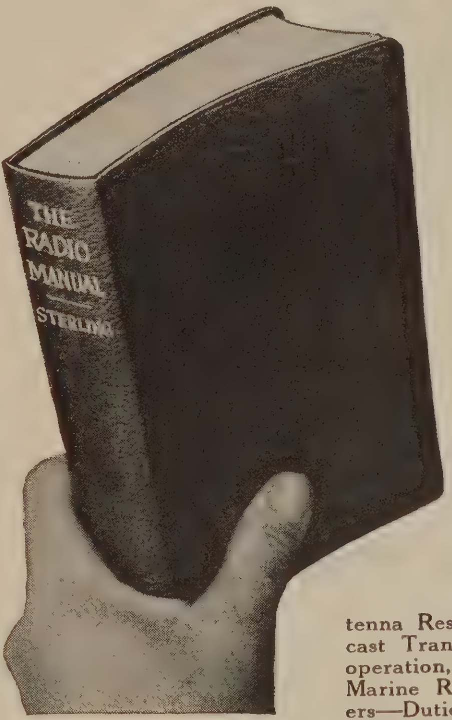

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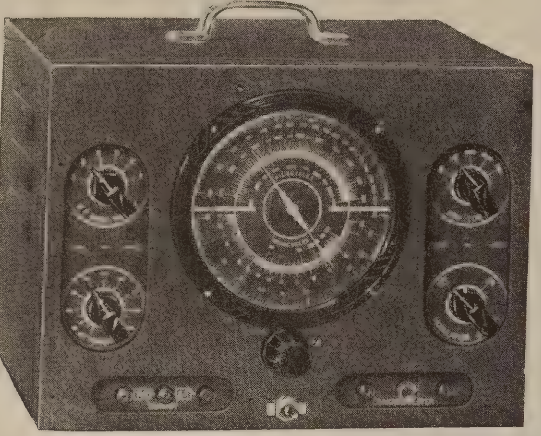

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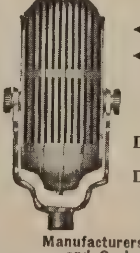

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RADIO Test Quiz???

(Continued from page 467)

a. Increases the voltage in a circuit several fold.
b. Increases the range of a voltmeter.
c. Increases the effective voltage in a plate circuit.
d. Increases the apparent voltage in a grid circuit.

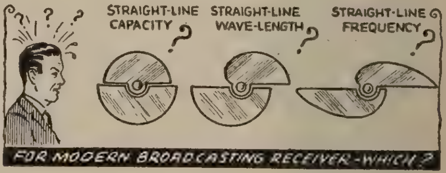
18. When a radio engineer tells you that your new apparatus should have P-B T, you know he means
a. Pre-band transmission.
b. Pretty-bum trimmers.
c. Push-button tuning.
d. Prime-Mu tubes.

19. A radio compass, as used on ships and planes, is very useful, but you'd be wrong if you said that it is
a. A compass which is corrected by means of a radio beam.
b. A means of determining the position of a plane or ship through the use of triangulation.
c. A loop antenna operated to determine the craft's direction from a transmitter.
d. A compass used by surveyors to determine a suitable location for a transmitter.

20. When Pa sent Willie out to buy a radio "fan" magazine, he spanked the kid for bringing back
a. Radio Guide.
b. Broadcasting.
c. Radio Stars.
d. Radio Mirror.

21. Being the 13th letter of the alphabet, M may be unlucky for you in this one, but try to tell what the m stands for in the following radio abbreviations.
a. mc.
b. mf.
c. ma.
d. mmf.
e. m.
f. mh.

22. In a transformer coupled audio frequency amplifier, a pulsating direct current is fed through the primary of the audio frequency amplifying transformer, with the result that the secondary produces
a. A higher voltage pulsating direct current.
b. A higher voltage non-pulsating direct current.
c. A higher voltage alternating current.
d. A higher amperage pulsating direct current.
e. A higher amperage non-pulsating direct current.
f. A higher amperage alternating current.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STRAIGHT-LINE WAVE-LENGTH
STRAIGHT-LINE FREQUENCY
FOR MODERN BROADCASTING RECEIVER—WHICH?

23. If you were designing a modern broadcast receiver, the type of tuning condenser you would be most likely to employ is
a. Straight line capacity.
b. Straight line wavelength.
c. Straight line frequency.
d. Modified straight line capacity.
e. Modified straight line wavelength.
f. Modified straight line frequency.

24. A strain type insulator is so-called because
a. It can stand high electrical strain.
b. It strains out unwanted stations.
c. It can stand high mechanical strain.
d. It puts an awful strain on the pocketbook.

25. Even though you may not believe it, an interference generator is most used
a. To drown out Russian programs in Germany and vice versa.
b. To test "noise-free" antenna installations.
c. To test shielding of a set.
d. No such device is commercially produced.

(Answers on page 512)

Ultra Short Waves and Television

Dr. G. W. Pickard

(Continued from page 453)

on these frequencies, for the good and sufficient reason that there is absolutely no other place for it in the whole radio spectrum. There is another good reason why it cannot go on *lower* frequencies, and this is the fact that the lower frequencies involve sky-waves, with consequent *plural path* transmission and a nasty mess of "ghost" images on the screen. The Federal Communications Commission has tentatively assigned, on an experimental basis only, 19 television channels, each 6 megacycles wide and running from 44 to 294 megacycles, and this assignment seems wise.

It is becoming increasingly evident that the problems confronting television as a public service are today economic rather than technical. Before it can become a public service comparable with sound broadcasting, channel assignments must be made commercial rather than experimental, many hundreds of miles of expensive coaxial cable must be laid for the distribution of network programs, and a large audience with comparatively expensive receivers must be built up. The programs themselves——the "daily grind" type of programs as distinct from the occasional "important event"——must be made *interesting in themselves* as distinct from the novelty of the medium, or television as a public service will most emphatically *get off to a false start!* Otherwise, as the novelty of seeing a picture on the screen wears off, and the audience becomes really critical of program material, there is the danger that the receivers will soon begin to gather dust.

And it must be constantly borne in mind that broadcasting in this country is solely supported by advertising, which pays for units composed of time and audience. Those myriads of us who listen from early morning to late at night to sound broadcasting, and who also go to the movies, know very well that the ear can take much more punishment than the eye. Also, one can hardly imagine a *television program* being used as a *background* for various home activities, bridge, for example. Taking these factors into consideration, it would seem that television programs would be a matter of two or three hours a day, rather than all day and half the night, so unless its advertisers pay rather dearly for their limited time, television stations will run in the red.

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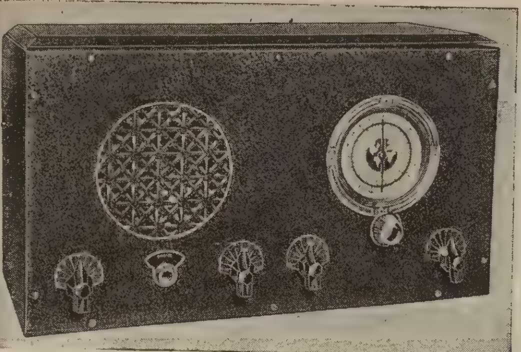
THE DOERLE MODEL D39



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Uses a 6k7g tube as screen grid tuned R.F. amplifier, a 6j7g tube as tuned electron coupled screen grid regenerative detector, a 76g tube as a driver audio which is fed into the popular and efficient 25l6g beam power audio output tube which delivers over two watts of undistorted audio power to the dynamic speaker.

A 25z6g tube is used as the rectifier and is fully capable of supplying the power requirements of the set. A type k92a tube is used as the ballast to drop the filament supply to the proper voltage.

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FLASH! SEND 10C FOR OUR NEW CATALOG containing CIRCUIT DIAGRAMS, and complete information on over 25 different types of short wave receivers and transmitters from $2.50 and up. This catalog is chock full of schematic and picture diagrams, hook ups and short wave information. A book in itself. Well worth the dime, which will be refunded with your first order.

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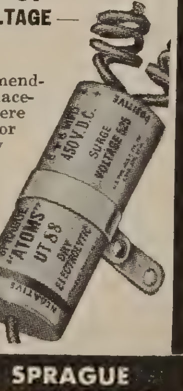

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Similar terms on Harvey, Hallicafter, National, RCA, RME, Temco transmitters and National, Thordarson, U.T.C., Utah, Stancor kits.

Special Department for Export Orders

HENRY RADIO SHOP
211 North Main Street Butler, Missouri

3-Tube A.C. Receiver

(Continued from page 480)

The *power-supply* is conventional, using a type 80 glass rectifier tube. The transformer provides 325 volts to each plate of the rectifier, 5 volts for the rectifier filament and 6.3 volts for the filaments of the 6K7 and 6F6.

The design is one developed in the laboratory of Wholesale Radio Service Company. It is available in kit form for the benefit of constructors who prefer to "roll their own." If the chassis supplied with the kit is used, the mounting holes provided in it and the panel automatically determine the placement. Keep the lead from the 6K7 grid terminal to the grid-leak and condenser as *short* as practical.

Parts List

1—Set 4-prong short wave coils (16-217 meters)
1—Pair broadcast coils (190-550 meters)
1—.00014 mf. tuning condenser
1—25,000 ohm regeneration control and switch
2—.5 mf. condensers
3—.01 mf. condensers
1—10 mf. condenser
1—3-30 mmf. trimmer condenser
1—Power transformer 325-0-325 V., 6.3 V., 5.0 V.
2—Octal sockets
2—4-prong sockets
1—Panel, punched and drilled, 7" x 10"
1—Chassis punched and drilled
1—Knob
1—Dial, vernier type
1—"Ant.—Gnd." binding post strip
1—R.F. choke, 2.5 mh.
1—A.C. line cord and plug
2—1 w. resistors, 100,000 ohms
1—½ w. resistor, 500,000 ohms
1—½ w. resistor, 2 meg.
1—½ w. resistor, 250,000 ohms
1—2 w. resistor, 500 ohms
1—Dynamic speaker, 2500 ohm field, with output transformer.
3—Tubes (6K7, 6F6, 80)

Coil Data

Meters	Grid Coil	Tickler
10-20	4¾ T. No. 22 D.S.C. (Spaced 6 T. per inch)	4 T. No. 31 D.S.C. (Close-wound)
20-40	10¾ T. No. 22 D.S.C. (Spaced 12 T. per inch)	6 T. No. 31 D.S.C. (Close-wound)
40-80	22¾ T. No. 22 D.S.C. (Spaced 16 T. per inch)	7 T. No. 31 D.S.C. (Close-wound)
100-245	67 T. No. 28 D.S.C. (Close-wound)	22 T. No. 28 D.S.C. (Close-wound)
230-570	12 banks, 8 T. each* No. 32 D.S.C.	32 T. No. 36 D.S.C. (Close-wound)

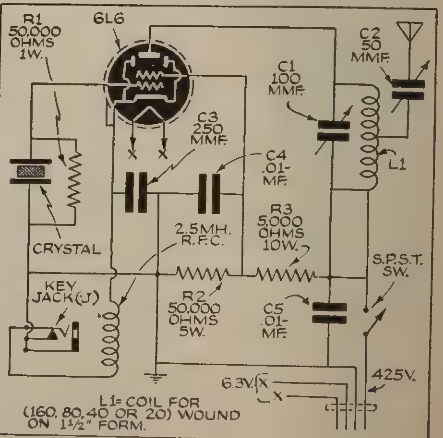
Form dia. 1¼". Tuning Condenser .00014 mf.
*Optional coil is 1 layer, 126 T. No. 28 S.S.C., Close-wound.

25 Watt Xmitter Kit

(Continued from page 480)

the crystal stops oscillating, which will be indicated by the failure of the neon tube to glow. By decreasing the capacity of C-2, the transmitter will function again and C-2 should be decreased until the set keys normally, as noted by listening to the signal in a receiver or a monitor. After this is done, it may be necessary to readjust C-1 slightly to compensate for the antenna.

The midget can be used as an exciter by connecting a wire from the antenna post to the grid of the following stage.



Hook-up of Eagle Xmitter

New HAM Licenses

COMPILED FROM THE LATEST RECORDS OF THE FEDERAL COMMUNICATIONS COMMISSION

THERE are now nearly 50,000 licensed radio amateurs in this country. And hundreds of new amateurs are being licensed every month.

Heretofore no publication has listed the names and addresses of the new licensees as issued. RADIO & TELEVISION Magazine now provides this unique service, and will publish a list of newcomers in every issue. Check the names carefully so that you will be able to get in touch, not only with those amateurs in your neighborhood and vicinity, but also those distant amateurs whom you wish to contact either by mail or by radio.

The first list contains 275 names of newly licensed amateurs.

K6QJS Leo A. St. Dennis, Morse Field, Naalehu, Hawaii.

K6QLB Bernard P. Showalter, 250 S. Hotel, Honolulu, T. H.

K6QLG Henry D. Kalehuawehe, Vineyard St., Wailuku, T. H.

K7CNJ Charles B. Michael, Quinhaqak, Alaska.

W1CGL Robert Nils Eichorn, 32 Lamper Hill Rd., Auburn, Mass.

W1DEU Henry Dudley Minich, 465 Main St., Melrose, Mass.

W1LOK John B. McGowan, 66 Bedford Rd., Woburn, Mass.

W1LOL Henry A. Sawinski, 15 Warren St., Taunton, Mass.

W1LOM George Kershenbaum, 1100 Albany Ave., Hartford, Conn.

W1LON Charles W. Knight, 41 Ralph, Springfield, Mass.

W1LOO Murray E. Hall, 2 Cliff St., Saugus, Mass.

W1LOP Julius L. Galinski, 7 Clay, Hartford, Conn.

W1LOQ Walter E. Tannan, 18 Windsor Rd., Somerville, Mass.

W1LOR Francis T. Wittmann, 124 Grove St., Melrose, Mass.

W1LOS George C. Wright, 7 South Main St., Sharon, Mass.

W1LOT Newton Stephen, 12 Howitt Rd., Boston, Mass.

W1LOU Raleigh Martin, Jr., 37 Russ Lane, Bristol, Conn.

W1LOV Basil L. Wright, 5 Shelby, East Boston, Mass.

W1LOW Victor H. Ziminski, 182 Marble St., Athol, Mass.

W1LOX Fredrick H. Tabor, Oyster Harbors, Osterville, Mass.

W1LOY Francis A. Webb, Old Mill Road, Osterville, Mass.

W1LOZ Carl P. Rounds, 17 Oakland St., Auburn, Maine.

W1LPA John Sckuton, 71 Davis Ave., Auburn, Maine.

W1LPC Geo. K. Boutwell, Lupinwood, Greenfield, Mass.

W1LPE Nickolas A. Chakos, 215 Saratoga, East Boston, Mass.

W1LPF Carroll M. Callamore, 116 Andrews St., Lowell, Mass.

W1LPG Bryant E. Richardson, 160th Co. C.C.C., Greenville, Maine.

W1LPH Willard E. Barnett, 20 Woodland Pl., Hyde Park, Mass.

W1LPM Wm. W. Fairbanks, Hartford, Canyville, Mass.

W1LPN John E. Callry, 486 School, Putnam, Conn.

W1LPT Andrews G. Moore, Airport, St. Johnsbury, Vt.

W1MXU John P. Tyskewicz, 19 Morris, Hartford, Conn.

W2BLQ Selwyn J. Slack, 188 Everett Pl., Englewood, N. J.

W2CRJ Charles E. Similey, 249 Ampere Parkway, Bloomfield, N. J.

W2EIA Herbert C. Cook, Lyan St. & Blossom Rd., Valley Stream, L. I., N. Y.

W2EJY Geo. E. Stephenson, 59 Roosevelt Ave., Roosevelt, N. Y.

W2GVA Leland A. Druny, 24 Furman Ave., Brooklyn, N. Y.

W2IAE Anthony A. Chizmadia, 107 Washington St., Perth Amboy, N. J.

W2KM Max J. Weiner, 117 Harrison Ave., Hasbrouck Heights, N. J.

W2LPO Sidney F. Curtis, 145-25 156th St., Jamaica, L. I., N. Y.

W2LPP Robert H. Kraft, 31 W. John St., Hicksville, N. Y.

W2LPQ Percy Laster, 1050 Hoe Ave., N. Y. C.

W2LPR Alfred F. Sprague, 18 Jamaica Blvd., Carle Place, N. Y.

W2LPS Merritt L. MacKnight, 961 Palisade Ave., North Bergen, N. J.

W2LPT Seymour Levine, 422 Crown St., Brooklyn, N. Y.

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W3HTV James R. Dale, Jr., 314 42nd St., Newport News, Va.

W3KS Louis E. Kearney, 4046 Maywood St., Phila., Pa.

W3MY Melville W. Ghen, 1410 Denniston, Pittsburgh, Pa.

W4AIK Leslie B. Stanton, 916 Spruce St., Gasden, Ala.

W4FQQ Kenneth Patterson, 47 Ave. "A," Ojus, Fla.

W4FQR Winborn L. Metcalfe, 5805 Central Ave., Tampa, Fla.

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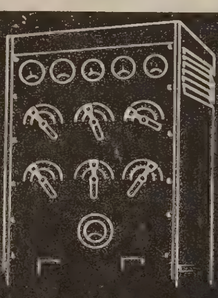

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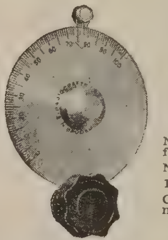

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(Continued on page 497)

All about the SHORT WAVE LEAGUE

A FEW WORDS AS TO THE PURPOSE OF THE LEAGUE

The SHORT WAVE LEAGUE was founded in 1930. Honorary Directors are as follows:

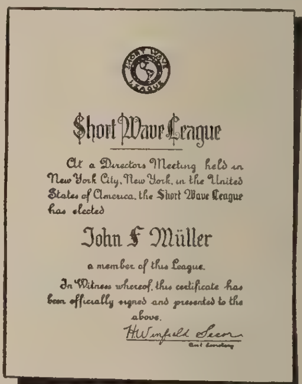
Dr. Lee de Forest, John L. Reinartz, D. E. Replogle, Hollis Baird, E. T. Somerset, Baron Manfred von Ardenne, Hugo Gernsback, Executive Secretary.

The SHORT WAVE LEAGUE is a scientific membership organization for the promotion of the short wave art. There are no dues, no fees, no initiations, in connection with the LEAGUE. No one makes any money from it; no one derives any salary. The only income which the LEAGUE has is from its short wave essentials. **A pamphlet setting forth the LEAGUE'S numerous aspirations and purposes will be sent to anyone on receipt of a 3c stamp to cover postage.**

FREE MEMBERSHIP CERTIFICATE

As soon as you are enrolled as a member, a beautiful certificate with the LEAGUE'S seal will be sent to you, provided 10c in stamps or coin is sent for mailing charges.

Members are entitled to preferential discounts when buying radio merchandise from numerous firms who have agreed to allow lower prices to all SHORT WAVE LEAGUE members.



Short Wave League

At a Directors Meeting held in New York City, New York, in the United States of America, the Short Wave League has elected

John F Müller

a member of this League.

In Witness whereof, this certificate has been officially signed and presented to the above.

H. Winfield Secor

If you wish your name **engraved** on the Free membership certificate, as illustrated above, please send 25c to cover cost.

SHORT WAVE ESSENTIALS LISTED IN OPPOSITE COLUMN SOLD ONLY TO SHORT WAVE LEAGUE MEMBERS

They cannot be bought by anyone unless he has already enrolled as one of the members of the SHORT WAVE LEAGUE or signs the blank below (which automatically enrolls him as a member, always provided that he is a short wave experimenter, a short wave fan, radio engineer, radio student, etc.).

Inasmuch as the LEAGUE is international, it makes no difference whether you are a citizen of the United States or any other country. The LEAGUE is open to all.

Application for Membership SHORT WAVE LEAGUE

SHORT WAVE LEAGUE 12-38
99-101 Hudson Street, New York, N. Y.

I, the undersigned, herewith desire to apply for membership in the SHORT WAVE LEAGUE. In joining the LEAGUE I understand that I am not assessed for membership and that there are no dues and no fees of any kind. I pledge myself to abide by all the rules and regulations of the SHORT WAVE LEAGUE, which rules you are to send to me on receipt of this application.

I consider myself belonging to the following class (put an X in correct space): Short Wave Experimenter ☐ Short Wave Fan ☐ Radio Engineer ☐ Student ☐

I own the following radio equipment:

Transmitting . . . .

Call Letters . . . .

Receiving . . . .

Name . . . .

Address . . . .

City and State . . . .

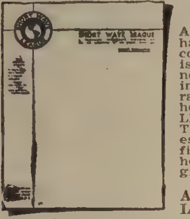
Country . . . .

I enclose 10c for postage and handling for my Membership Certificate.

Accessories for Members of the

SHORT WAVE LEAGUE

Every member of the SHORT WAVE LEAGUE wants to identify himself in some way. For your convenience the League directors have prepared suitable letterheads, lapel buttons, stickers, etc. In addition there are many short-wave accessories, such as maps, globes, etc., which the League offers only to members at special prices. Take your choice from this advertisement. THESE ESSENTIALS ARE SOLD ONLY TO LEAGUE MEMBERS.



A—50c per 100

LEAGUE LETTERHEADS

A beautiful, official letterhead has been designed for members' correspondence. The letterhead is invaluable when it becomes necessary to deal with the radio industry, mail order houses and radio manufacturers, as many houses offer members of the LEAGUE preferential discount. The letterhead is also absolutely essential when writing for verification to radio stations either here or abroad. It automatically gives you a professional standing.

A—SHORT WAVE LEAGUE letterheads, per 100 .... **50c**

WORLD GLOBE

This important essential is an ornament for every den or study. It is a globe, 6 in. in diameter, printed in fifteen colors, glazed in such a way that it can be washed. This globe helps you to intelligently log foreign stations. The base is of solid walnut, and the semi-meridian of a nickel-like metal. Entire device substantially made, and will give an attractive appearance to every station, emphasizing the long-distance work of the operator.

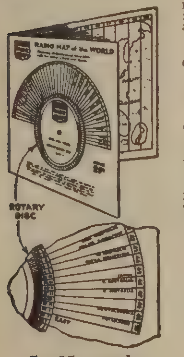
D—Globe of the World .... Prepaid **89c**

D—89c each

SHORT WAVE MAP OF THE WORLD

This beautiful map, measuring 18x26 in. and printed in 18 colors is indispensable when hung in sight or placed "under the glass" on the table or wall of the short wave enthusiast. It contains a wealth of information such as distances to all parts of the world, political nature of the country in which a broadcast station is located, etc., and from the manner in which the map is blocked off gives the time in different parts of the world at a glance.

F—SHORT WAVE Map of the World.....Prepaid **25c**


RADIO MAP of the WORLD
ROTARY DISC

C—25c each

WORLD RADIO MAP AND STATION FINDER

The finest device of its kind published. The world's map on heavy board is divided into 23 sections, while the rotary disc shows you immediately the exact time in any foreign country. Invaluable in logging foreign stations. Also gives call letters assigned to all nations. Size 11"x22".

C—Radio Map of the World and Station Finder. .... Prepaid **25c**

LEAGUE LAPEL BUTTON

E—35c each

This beautiful button is made in hard enamel in four colors, red, white, blue and gold. It measures three quarters of an inch in diameter. By wearing this button, other members will recognize you and it will give you a professional air. Made in bronze, gold filled, not plated. Must be seen to be appreciated.

E—SHORT WAVE LEAGUE lapel button .... Prepaid **35c**

EE—SHORT WAVE LEAGUE lapel button, like the one described above but in solid gold. .... Prepaid **$2.00**

LEAGUE SEALS

G—15c for 25

These seals or stickers are executed in three colors and measure 1¼ in. in diameter, and are gummed on one side. They are used by members to affix to stationery, letterheads, envelopes, postal cards and the like. The seal signifies that you are a member of the SHORT WAVE LEAGUE. Sold in 25 lots or multiples only:

G—SHORT WAVE LEAGUE seals, per 25, ... Prepaid **15c**

SHORT WAVE LEAGUE
99-101 Hudson St.,
New York, N. Y.

SHORT WAVE LEAGUE 12-38
99-101 Hudson Street, New York, N. Y.
Gentlemen.
☐ I am a member of the SHORT WAVE LEAGUE
☐ Please send me application for membership in the SHORT WAVE LEAGUE

Please send me the following short wave essentials as listed in this advertisement:
....
....
....
....
....
for which I enclose $.......... herewith.

Name ....
Address ....
City and State ....
Country ....

(The LEAGUE accepts money order, cash or new U. S. Stamps in any denomination. Register cash and stamps.)

Shooting Trouble on the Ham Transmitter

(Continued from page 468)

Plate Meter Flickered with B-Return Open

The transmitter consisted of a 6F6 oscillator, 6L6 buffer or doubler and an HF-100 amplifier. Upon turning on the filament switch, the plate currents of the oscillator and doubler would flicker and vary over a wide scale, when the filaments had warmed, although the plate switch which simultaneously controlled the plate power to the final amplifier and the B negative returns to the exciter was off.

Occasionally the plate currents would stop, but then after a few seconds would continue as described. The transmitter was shut off and this procedure tried.

An ohmmeter was placed between the cathode and ground to determine if there was a high resistance short or leak between possibly the B negative relay contacts or the associated wiring. No indication was observed but this was not considered as a conclusive test because of the possibility that part of the wiring was breaking down only when a voltage was actually set up. Next—

An external source of 100 volts was obtained with the B negative grounded to the transmitter chassis and the B positive attached to the cathode of the 6F6 and the 6L6 with a ½ watt neon bulb in series with one of the legs. The B negative switch that controlled the relay which was connected from cathode to ground to complete the circuit, was left in an off position. When the voltage was turned on, the same condition manifested itself, that is, the bulb flickered. The wiring in the transmitter from cathode through the switch to ground was then disconnected from the socket. This would then prove whether the wiring was at fault or not. Upon reapplication of the voltage, the condition was found to still exist. This proved that the wiring was in good condition. The 6F6 was then removed from the socket, but still the condition persisted. The 6L6 was removed and the condition had disappeared.

It was therefore concluded that the filament of the 6L6 was periodically shorting to the cathode when the filament was warm, thereby causing an indication of plate current on both tubes in conformity with the swaying of the filament as it made contact with the cathode.

On the Trail of a "Shorted" Secondary

At the time of the breakdown, proper servicing instruments were not available and hence, handicapped the author in proving that the part was at fault.

The circuit involved was the main power-supply for an HF-200 amplifier and the power supply for the modulator. One power transformer was used to supply voltages to both stages and consisted of three separate windings. A humorous situation presented itself when the transmitter was operated. Upon speaking into the microphone, the main fuse would blow. This was indicative of some trouble because the same size fuse had been used previously and was of ample rating. Apparently on modulation (a Class "B" modulation system was used), the increased current drain would set up a high line current which was just sufficient to melt the fuse.

Of course the main power transformer was immediately thought of as the cause, and so the secondary connections to the transformer were disconnected preparatory to testing it out.

The normal procedure would be to test each of the three individual secondaries with

(Continued on following page)

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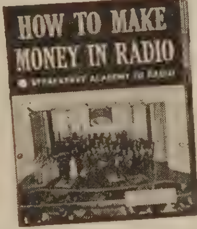

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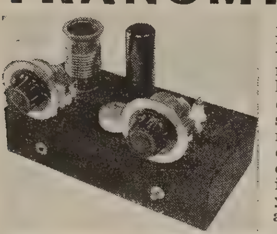
TRANSMITTER



An efficient, economical transmitter, using the 6L6 metal tube. The kit is furnished complete with essential parts, fully mounted on black crackled Bud chassis. No drilling necessary. All you need is pliers and soldering iron.

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COMPLETE KIT, READY TO WIRE

We furnish a ready-wound plug-in coil for your particular band. Your choice of 160-80-40 or 20 meters.

$6.95

ACCESSORIES

6L6 Power Tube—88c. High Grade Crystal and Holder—$2.50. Ready-wound plug-in coils for extra bands—50c ea. Wiring [optional] $2.00.

Power Supply Kit for FB25 or Eagle Minuteman $3.95
5Z3 or 80 Tube for power supply 29c
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FEATURES

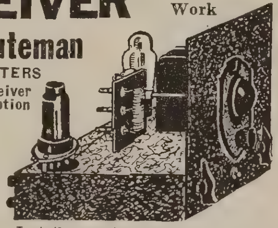
● Versatility ● Economy ● Quality parts ● 2 band operation with one Crystal ● 25 watts of power ● Easily Constructed. ● Simple to Operate. ● An ideal transmitter or Exciter.

Just the **RECEIVER** for Duplex Work

EAGLE Minuteman

2½-5-10 METERS

Amateur Band Receiver for Consistent reception on the loudspeaker.



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2 Tubes 6C5 & 42 $1.25
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Just the receiver for duplex work. The most sensitive and selective super regenerator receiver known, uses metal and glass tubes. The last word in performance and simplicity of design. The 1st 2½ to 10 meter receiver ever offered to the amateur at such ridiculously low price. No license necessary to operate it.

MAIL ORDERS FILLED PROMPTLY.
$2.00 Deposit, Check or Money Order, Balance C.O.D.

EAGLE RADIO CO.
84 CORTLANDT ST., DEPT. J, NEW YORK CITY

Shooting Trouble on the Ham Transmitter

(Continued from preceding page)

an ohmmeter, and thus determine whether there was a serious departure in resistance from similar windings.

Two secondary windings were rated to deliver 1000 volts and one winding 1500 volts. The turns ratio for the 1000 volt windings was 8.7 to 1 and for the 1500 volt winding, 13 to 1. Knowing the turns ratio, it would then be possible to calculate the voltage at the primary when a 110 volt source was connected to any one of the secondaries. If the voltage obtained at the primary deviated from the calculated value, it would then be sufficient proof that part of that secondary was shorted. A 0-150 A.C. voltmeter was available and the line voltage measured, which proved to be 125 volts. The stepped down voltage at the primary when the line voltage was connected to a 1000 volt secondary should be 1.43 volts. With this in mind, the test was run and the voltage obtained at the primary was 1.42 volts as indicated on a 0-3 volts A.C. voltmeter that was connected across the primary. As this was very close to the calculated value, it was agreed that that secondary did not have any *shorted* turns. The test was then repeated on the other 1000 volt winding, and this time the voltmeter indicated 1.55 volts, showing that a considerable portion of the turns was *shorted* (short-circuited), thus lowering the turns ratio and increasing the voltage by a relative amount.

This winding was used for the modulator power-supply and when the current through the winding increased, a heavy parasitic load was reflected back into the primary, thus blowing the fuse.

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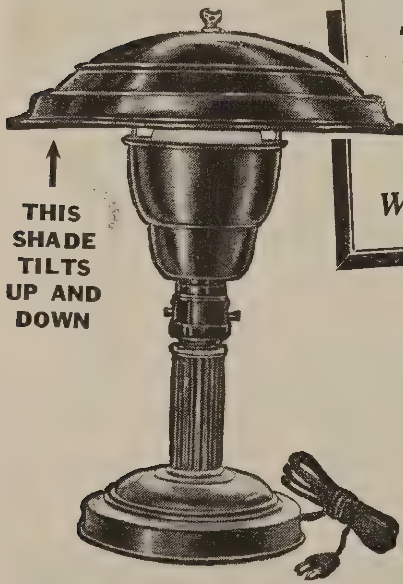

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(*Continued from page 494*)

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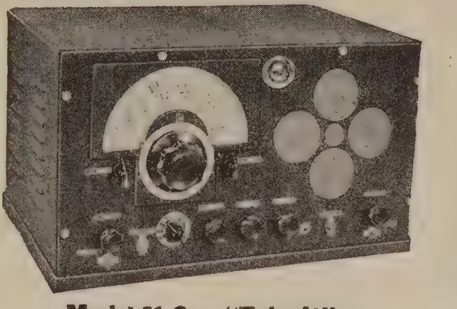

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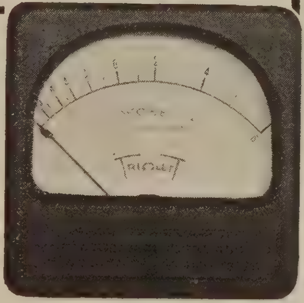

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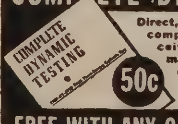

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(Continued from preceding page)

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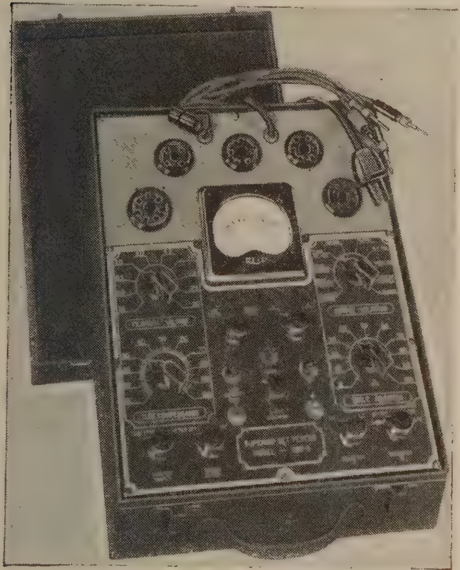
No amateur can actually know what takes place in a circuit unless he has the proper equipment to enable him to diagnose actual circuit conditions.

The time saved by the use of such equipment may be used for more hours of operating and enjoyment of the equipment. Often a part will change its value after an hour or so of use and it is practically impossible to detect a condition of this sort, without the proper measuring instruments. For that reason, we have expanded this department to include test equipment.

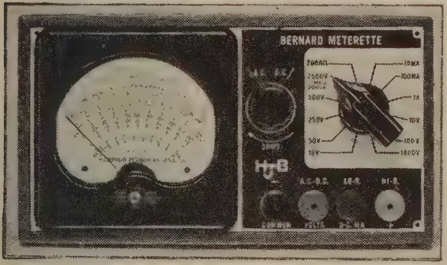
Versatile Multimeter

● A NEW multimeter for A.C. and D.C. use is being produced by Superior Instruments Co. This model 1180 meter works on 90 to 120 volts, 60 cycles, A.C.; it tests all 4, 5, 6, 7, 7L and octal base tubes, both on the meter and with a neon tube. Its voltage ranges are 0-15, 0-150 and 0-750 D.C. and A.C. Its current ranges are 0-15, 0-150, 0-750 ma., A.C. and D.C., plus 0-1 ma. D.C. Its resistance ranges, 0-500 ohms, to 5 megohms. Its capacity scale, .0005 to 1 mf. and .05 to 200 mf. Its decibel ranges, minus 10 to plus 19, plus 38, plus 53. Its inductance range 1 to 700 henries. This test instrument is provided with a sloping panel and carrying case, and comes complete with test leads, charts and instructions.



Test Meter With Unusual Range

● A POCKET-SIZED 5,000-ohms-per-volt 14 range universal micro-multimeter, known as Meterette, is being featured by H. J. Bernard. It employs a 3" square Bakelite-cased meter, with a 200 microampere, d'Arsonval movement.



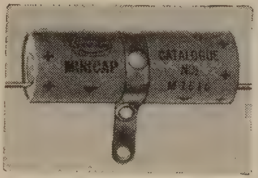
The Meterette has only two controls, due to a special method of combining the "Ohms" adjuster with the A.C.-D.C. switch. A 2,500-volt D.C. range is stressed for amateur, cathode-ray and television purposes.

The ranges are: 0-10-50-250-500-2,500 volts D.C. at 5,000 ohms per volt; 0-10-100-1,000 volts A.C. at 1,200 ohms per volt; 0-2,000-2,000,000 ohms; 0-200 microamperes, 0-10-100-1,000 milliamperes.

Insuline Catalog No. 200

Insuline Corp. of America. Pictures and descriptions of items for the Constructor, Ham and Service Man. A complete index makes this unusually well laid-out catalog easy to use.

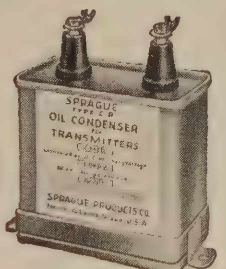
New Dual Electrolytics



● THE Minicap line of Solar condensers now includes a dual unit which extends the capacitors to practically all commonly used values. It is claimed that these electrolytic capacitors occupy minimum space, and their permanent sealing has longer life than ever before.

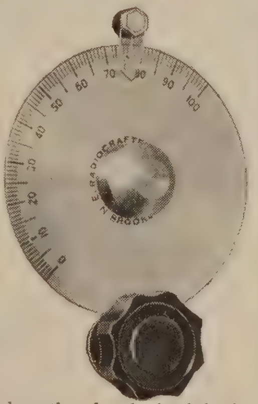
New Transmitting Condensers

● OIL-FILLED, oil-impregnated construction and rectangular shape are the features of the new Sprague CR transmitting condensers. These are labeled with complete information, including capacity, maximum d.c. working voltage and maximum surge voltage. The oil used has a flash-point of 500° F. and thus affords very high protection.



New Vernier Dial

● A HANDSOME nickel-silver disc, 2¾" in diameter, with etched black numerals, is the central portion of this new dial being produced by New England Radiocrafters. It is driven at slow speed through a friction clutch by means of a neat black knob which may be mounted at any angle from the center line in order to obtain panel symmetry. The knob is not supplied as part of the outfit. It is easily mounted, being attached on the front of the panel, in which it is necessary to drill only one hole for the pointer and another for the knob bushing. A 4" dial will soon be available.



Hammarlund's New Catalog

● THE new Hammarlund '39 catalog has 16 pages, printed in two colors, and lists midget, split stator, transmitting and micro condensers; various types of plug-in coils and forms; transmitting and receiving chokes; flexible couplings; coil and tube shields; variable, air-tuned and iron core transformers; trimming, padding and neutralizing condensers; receivers and cabinets.

How To Build Radio Receivers

This 44 page book published by the Meissner Mfg. Co., contains several useful formulae and charts, as well as a technical discussion of design principles, general hints for the constructor, and complete instructions for the construction and operation of twenty of the most popular Meissner kits, each description being illustrated with large detailed schematic and picture diagrams. A full list of parts for each individual set is likewise provided. Price of book 50c.

Cornell-Dubilier New Catalog No. 161

● THIS new 40 page catalog, handsomely printed in two colors, gives photographic illustrations, physical measurements, electrical characteristics and list prices of the wide variety of capacitors which the company makes. Included are:— eleven types of dry electrolytics, two types of wet electrolytics, fifteen types of paper condensers, two types which use Dykanol, six types of mica condensers and two types of interference filters.

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Radio Beginner's Course

(Continued from page 465)

current by means of an A.C. generator, there are a number of things that we can do with this current. We can put the current through a coil and get a magnetic field; and if we place another coil near to the first one we will get our current back again. But we have already learned that iron is a much better conductor of magnetic lines of force than the surrounding air. If then we would provide the magnetic lines of force with an "iron" path instead of an "air" path, we would get a greater transfer of energy. At this point, let us no longer call the coils of wire "first" coil and "second" coil, but rather "primary" coil and "secondary" coil. (Fig. 4.)

So far the primary and secondary have had the *same* number of turns. But suppose that we made the *secondary* coil with *twice* the number of turns that it had before. We would then find that the voltage across the secondary would be doubled. If we tripled the number of turns in the secondary coil we would get triple the voltage. Fig. 5, using conventional radio symbols, shows a simple transformer connected across an A.C. generator. If our generator were designed to deliver 110 volts, we could get 220 volts in the secondary by simply winding that secondary coil with twice the number of turns that the primary coil has. Thus we can increase our voltage, but we do so at the expense of our current, which becomes reduced.

The voltage times the current in amperes equals watts of power. Suppose that we built a step-up transformer that would give us *twice* the voltage of the generator. If we measured the reduced amount of current and multiplied it by the increased voltage, we would get an answer which we would call "watts."

The *thermo-galvanometer* is shown in Fig. 6. If two dissimilar metals are brought together and heated, a current of electricity is generated. The current generated is in direct proportion to the amount of heat. In this case, if we passed a current through the wire marked A, the two dissimilar metals connected to the wire would increase sufficiently in temperature to develop an electric current which would be indicated on the galvanometer.

Still another method of measuring current is through the use of a *hot-wire* ammeter, as shown in Fig. 7. In this instance, when a current passes through the wire marked A, the wire gets warm and expands, causing the spring to move the indicating needle over a scale. The amount that a given wire will expand depends upon the amount of current.

However, the most widely employed current or voltage measuring device is the D'Arsonval instrument, shown in Fig. 8. Once again we have our powerful steel magnet. Placed between the poles of this magnet is a tiny coil of wire, delicately pivoted in place. A needle pointer is connected to the coil and so placed that it can move over a scale. The needle is held in zero position by means of a small, fine spring, quite similar to the hair springs found in watches.

Now let us pass a small current through the coil; this will create a magnetic field about the coil. This magnetic field will tend to align itself with the magnetic field already existing between the poles of the permanent magnet; hence, the coil of wire will move.

(Lesson 3 next month covers resistance, inductance and capacity and oscillatory circuits.)

RADIO INSTRUCTION

HOW TO LEARN CODE

Whether you wish to enter radio as a career or as a hobby the All Electric Master Teleplex Code Teaching Machine will show you how. Teleplex records your sending in visible dots and dashes on a specially prepared waxed paper tape and then sends back to you at any speed you desire. It does not merely show you code. It is code. No experience needed.

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World Short Wave Stations

(Continued from page 476)

31 Met. Broadcast Band

Mc.	Call	
9.600	RAN	**MOSCOW, U.S.S.R.,** 31.25 m. Daily exc. Sun. 6-10 pm. Sun. 6-7, 9.15-10 pm.
9.595	HBL	**GENEVA, SWITZERLAND,** 31.27 m., Addr. Radio Nations. Irregular.
9.590	VUD2 VUD3	**DELHI, INDIA,** 31.28 m. Addr. All India Radio, 1.30-3.30 am., 7.30 am.-12.30 pm., 8.30-10.30 pm.
9.590	PCJ	**HUIZEN, HOLLAND,** 31.28 m., Addr. (See 15.220 mc.) Sun. 2-3, 7-9.25 pm. Tues. 1.45-3.40, 7.15-8.45, 9-10.30 pm., Wed. 7.15-8.30 pm., Fri. 8-9 pm.
9.590	VK6ME	**PERTH, W. AUSTRALIA,** 31.28 m., Addr. Amalgamated Wireless of Australasia, Ltd. 6-9 am. exc. Sun.
9.590	VK2ME	**SYDNEY, AUSTRALIA,** 31.28 m., Addr. Amalgamated Wireless of Australasia, Ltd., 47 York St., Sun. 1-3 am.; 4.30-8.30 am.; 9-11 am.
9.590	W2XE	**NEW YORK, N. Y.,** 31.28 m., Addr. CBS, 485 Madison Ave., Irregular.
9.590	W3XAU	**PHILADELPHIA, PA.,** 31.28 m. Relays WCAU.
9.580	GSC	**DAVENTRY, ENGLAND,** 31.32 m., Addr. B. B. C., Portland Pl., London, W. 1, 4.15-6, 6.20-8.30, 9.20-11.25 pm., 9 am.-12 n.
9.580	VLR	**MELBOURNE, AUSTRALIA,** 31.32 m. Addr. Box 1686, G. P. O. Daily 3.30-8.30 am. (Sat. till 9 am.) Sun. 12.01-7.30 am. Also daily exc. Sat. 9.25 pm.-2 or 2.15 am. Sat. 5-10.30 pm.
9.580	OAX5C	**ICA, PERU,** 31.32 m. Radio Universal 6-10 pm.
9.570	KZRM	**MANILA, P. I.,** 31.35 m., Addr. Erlanger & Galinger, Box 283. Sun. 3-10 am. Daily exc. Sat. 4.30-7 pm., 11.15 pm.-12.15 am. Daily exc. Sun. 4-10 am.
9.570	WIXK	**SPRINGFIELD, MASS.,** 31.35 m., Addr. Westinghouse Electric & Mfg. Co. Relays WBZ 7 am. to 1 am. Sun. 8 am.-1 am.
9.560	DJA	**BERLIN, GERMANY,** 31.38 m., Addr. Broadcasting House. 12.05-11 am., 7-10.45 pm.
9.550	TPB11	**PARIS, FRANCE,** 31.41 m. Addr. (See 15.245 mc.) 2-4 am., 11.15 am.-6 pm.
9.550	W2XAD	**SCHENECTADY, N. Y.,** 31.41 m., General Electric Co., 6.15-10 pm.
9.550	OLR3A	**PRAGUE, CZECHOSLOVAKIA,** 31.41 m. (See 11.840 mc.) Irreg.
9.550	XEFT	**VERA CRUZ, MEX.,** 31.41 m. 10.30 am.-4.30 pm., 10.30 pm.-12.30 am.
9.550	YDB	**SOERABAJA, JAVA,** 31.41 m., Addr. N.I.R.O.M. Daily exc. Sat. 6-7.30 pm., 4.30 to 10.30 am. Sat. 4.30-11.30 am.
9.550	VUB2	**BOMBAY, INDIA.** 31.41 m., Addr. All India Radio. 9.30-10.30 pm., 12 m.-2.30 am.
9.540	DJN	**BERLIN, GERMANY,** 31.45 m., Addr. (See 9.560 mc.) 4.50-10.45 pm.
9.540	HJ5ABD	**CALI, COLOMBIA,** 31.45 m., Addr. La Voz de Valle. 12 n.-1.30 pm., 5.10-9.40 pm.
9.540	VPD2	**SUVA, FIJI ISLANDS,** 31.45 m., Addr. Amalgamated Wireless of Australasia, Ltd. 5.30-7 am.
9.535	JZI	**TOKYO, JAPAN,** 31.46 m., Addr. (See 11.800, JZJ) 2.30-4, 4.30-5.30 pm.
9.535	—	**BERNE, SWITZERLAND,** 31.46 m., 1-2 pm. exc. Mon. and Tues.
9.530	W2XAF	**SCHENECTADY, N. Y.,** 31.48 m., Addr. General Electric Co. 4 pm.-12 m. Sat. 1 pm.-12 m.
9.530	VUC2	**CALCUTTA, INDIA.** 31.48 m. Addr. All India Radio. 2.06-4.06 am.
9.526	XEDQ	**GUADALAJARA, GAL., MEXICO,** 31.49 m. Irregular 7.30 pm. to 12.30 am.
9.525	ZBW3	**HONGKONG, CHINA,** 31.49 m., Addr. P. O. Box 200. 11.30 pm. to 1 am., 3-10 am.
9.525	LKJ1	**JELOY, NORWAY,** 31.49 m. 5-8 am.
9.523	ZRH	**ROBERTS HEIGHTS, S. AFRICA.** 31.5 m., Addr. (See ZRK, 9.606 mc.) Daily exc. Sun. 5-7.30 am.; Sun. 5.30-7 am.
9.520	OZF	**SKAMLEBOAEK, DENMARK,** 31.51 m., Addr. Statsradiofonien, Heibergsgade 7, Copenhagen., 2-6.40, 8-11 pm.
9.520	YSH	**SAN SALVADOR, EL SALVADOR** 31.51 m., Addr. (See 7.894 mc.) Irregular 6-10 pm.
9.510	GSB	**DAVENTRY, ENGLAND,** 31.55 m., Addr. (See 9.580 mc.—GSC) 1.30-4, 4.15-6, 6.20-8.30, 9.20-11.25 pm.
9.510	HJU	**BUENAVENTURA, COLOMBIA,** 31.55 m., Addr. National Railways. Mon., Wed. and Fri. 8-11 pm.
9.510	—	**HANOI, FRENCH INDO-CHINA.** 31.55 m. "Radio Hanoi", Addr. Radio Club de L'Indochine. 12 m.-2 am., 6-10 am.
9.500	VK3ME	**MELBOURNE, AUSTRALIA,** 31.58 m., Addr. Amalgamated Wireless of Australasia, 167 Queen St. Daily except Sun. 4-7 am.
9.500	XEWW	**MEXICO CITY, MEX.,** 31.58 m. Addr. Apart. 2516. Relays XEW. 6 pm.-12 m.
9.500	OFE	**LAHTI, FINLAND,** 31.58 m., Addr. Finnish Brcst. Co., Helsinki. 2.15-5 pm.
9.500	HS8PJ	**BANGKOK, SIAM,** 31.58 m. Thursday, 8-10 am.
9.488	EAR	**MADRID, SPAIN,** 31.6 m., Addr. (See 9.860 mc.) 7.30-8.30 pm. Mon., Tues., Thur., Sat. at 9.30 pm. also.

End of Broadcast Band

Mc.	Call	
9.445	HCODA	**GUAYAQUIL, ECUADOR,** 31.77 m. Irregularly till 10.40 pm.
9.437	COCH	**HAVANA, CUBA,** 31.8 m., Addr. 2 B St., Vedado. 8 am.-9.30 pm. Sun. 8 am.-12 m.
9.380	—	**TANANARIVE, MADAGASCAR,** 31.96 m. Addr. Le Directeur des PTT, Radio Tananarive, Administration PTT. 12.30-12.45, 3.30-4.30, 10-11 am. Sun 2.30-4 am.
9.370	XOY	**CHENGTU, CHINA,** 32.02 m., 9.45-10.30 am.
9.355	HC1ETC	**QUITO, ECUADOR,** 32.05 m., Addr. Teatro Bolivar, Thurs. until 9:30 p.m.
9.350	COCD	**HAVANA, CUBA,** 32.08 m., Addr. Box 2294. Relays CMCD 10 a.m.-11.30 pm. Sun. 10 am.-9 pm.
9.345	HBL	**GENEVA, SWITZERLAND,** 32.08 m., Addr. Radio Nations. Off the air at present.
9.330	OAX4J	**LIMA, PERU,** 32.15 m., Addr. Box 1166, "Radio Universal." 12 n.-3 pm., 5 pm.-1 am.
9.300	HIG	**CIUDAD TRUJILLO, D. R.,** 32.28 m. 7.10-9.40 am., 11.40 am.-2.10 pm., 3.40-9.40 pm.
9.280	HC2CW	**GUAYAQUIL, ECUADOR,** 32.31 m., 11.30 am.-12.30 p.m., 8-11 pm.
9.200	COBX	**HAVANA, CUBA,** 32.59 m. Addr. San Miguel 194, Altos. Relays CMBX 7 am.-12 m.
9.125	HAT4	**BUDAPEST, HUNGARY,** 32.88 m., Addr. "Radiolabor," Gyali-ut, 22. Sun. and Wed. 7-8 pm., Sat. 6-7 pm.
9.100	COCA	**HAVANA, CUBA,** 32.95 m., Addr. Galiano No. 102. Relays CMCA 9 am.-12 m.
9.091	PJC1	**CURACAO, CURACAO.** 50.33 m., Mon., Wed., Fri. 6.36-8.36 pm., Sun. 10.36 am.-12.36 pm.
9.030	COBZ	**HAVANA, CUBA,** 33.32 m., Radio Salas Addr. P. O. Box 866. 7.45 am.-1.15 am. Sun. 7.45 am.-12 m. Relays CMBZ.
8.965	COKG	**SANTIAGO, CUBA,** 33.44 m. Addr. Box 137. 9-10 am., 11.30 am.-1.30 pm., 3-4.30, 5-6, 10-11 pm., 12 m.-2 am.
8.841	HCJB	**QUITO, ECUADOR,** 33.5 m. 7-8.30 am., 11.45 am.-2.30 pm., 5-10 pm., except Mon. Sun. 12 n.-1.30 pm., 5.30-10 pm.
8.700	HKV	**BOGOTA, COLOMBIA,** 34.46 m. Tues. and Fri. 7-7.20 pm.

(Continued on page 505)

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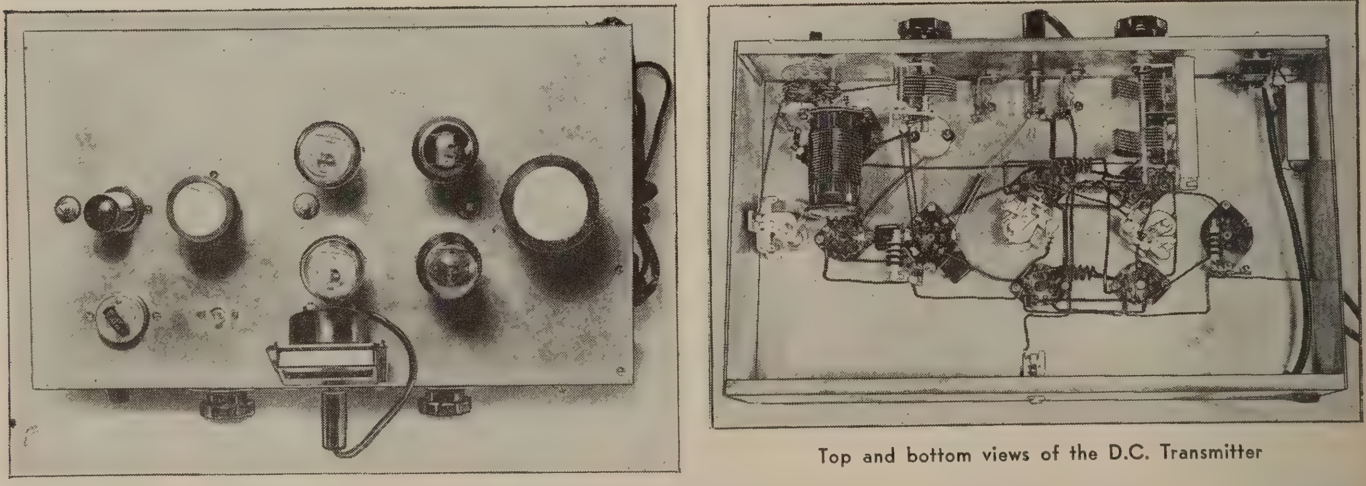
110 Volt D.C. Transmitter—Part II—Conclusion

Herman Yellin, W2AJL



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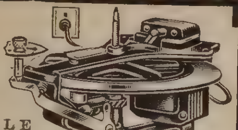

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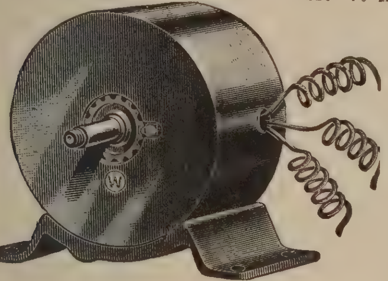

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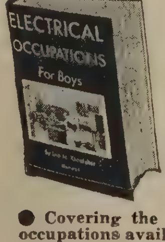

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cathode coil socket about ¼ inch behind the coil switch, making for very *short* leads. The cathode condenser is mounted alongside the oscillator tube socket with its shaft slotted with a hacksaw and protruding above the chassis for ready adjustment.

Although a thermocouple milliammeter will measure the crystal current accurately, such accuracy is not needed, especially with the high expense of this type of meter. A 60 milliampere (2 volt) pilot-light bulb will serve admirably, indicating when the current is too high and providing a valuable aid in tuning the oscillator for optimum output. The allowable current varies among different types of crystals, being about 100 milliamperes maximum for the variable frequency crystal used by the author.

Oscillator Coupling

The oscillator is inductively coupled to the amplifier by means of a split grid coil wound on the same form as the oscillator plate coil, one section on each side of the plate coil. Each of the grid coils (L-2 & L-3) consists of the same number of turns and is spaced the same distance from the ends of the plate coil and is wound in the same direction. Excitation to the amplifier is determined by the number of turns in the grid coils and the distance separating them from the plate coil winding. Increasing the number of turns, or winding the grid coils closer to the plate winding, will *increase* the excitation. If the coil winding specifications are followed exactly, the excitation will be just right, and no adjustments to the coil should be necessary.

It will be noticed that both the oscillator and amplifier plate coils are center-tapped. In winding these coils, each half of the coil wound as a separate coil. The ends of the coils then appearing at the center of the dual coil are soldered together inside the coil form, and one of the wires brought to the proper coil form prong. Taps on the oscillator cathode coil are made in the same manner.

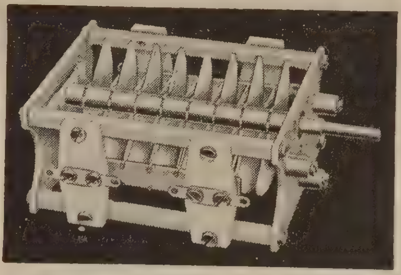
Amplifier

The amplifier is quite conventional, consisting of four 25L6G tubes in push-pull parallel. Between the grids of each pair of parallel tubes is placed a small R.F. choke (RFC-3) to prevent parasitics. These consist of six turns of No. 18 hookup wire, *air-wound* to a diameter of ⅜ inch and the turns spaced about twice the wire diameter. Insertion of these chokes effectively squelches any tendency towards parasitics.

Cross neutralization is employed in the amplifier, using a pair of variable neutralizing condensers having a maximum capacity of 6 mmf. Condensers with as low a minimum capacity as possible should be used, since the interelectrode capacity of the 25L6 is quite low. These condensers are mounted on the chassis with their shafts extending above the chassis to facilitate tuning up the transmitter. As is the case with all the other variable condensers, these condensers must be *insulated from the chassis*. Ordinary extruded fibre washers will prove adequate because of the low voltages encountered. If the condenser shafts are slotted with a hacksaw, the condensers can be adjusted with an *insulated screw-driver* and no knobs will be needed.

In wiring the push-pull amplifier stage, keep the leads from the grid coils (L-2 and L-3) to the grids of the 25L6Gs equal in length. Likewise keep the wires from the plates of the tubes to the ends of the plate coil (L-5) and to the split stator tank condenser (C-6) equal in length. A balanced wiring layout will be much freer from parasitics and will not prove difficult to neutralize.

(Continued on following page)



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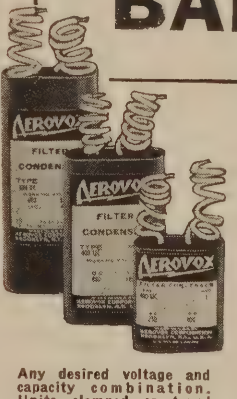

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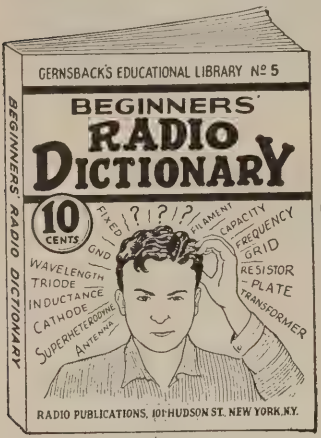
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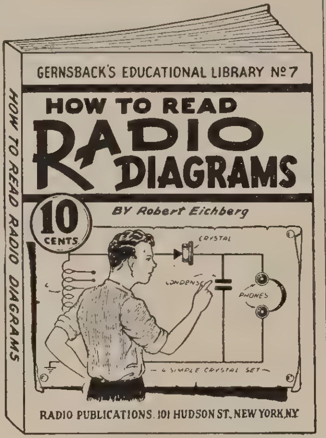
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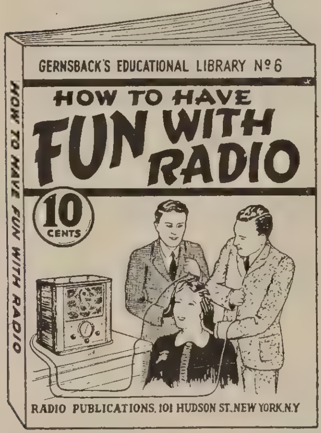
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110 Volt D.C. Transmitter

(Continued from preceding page)

Tuning Up

With all wiring completed, the transmitter is ready to be tuned-up. This is not at all difficult, since once the preliminary adjustments, such as adjusting the oscillator cathode condenser and the amplifier neutralizing condensers have been completed, there are only two tuning controls.

After the transmitter has been connected to the 110 volt D.C. line, first being certain that the *positive* side of the line will connect to the plates of the tubes and *not* to the chassis, close switch SW-3, lighting the *filaments* of all the tubes. Let the tubes warm up for about 30 seconds and then close switch SW-2 which will apply the *plate voltage.* With the meter plug inserted in the oscillator cathode jack (J-1) we are ready to tune the oscillator. Insert the crystal in the crystal socket, and (assuming that operation of the transmitter is desired on the second harmonic of the crystal) make sure that the coils in the oscillator and amplifier *plate* circuits are set for the band of double the oscillator frequency. With the cathode tuning condenser set at about 75 percent of its maximum capacity and the switch SW-1 set at the proper tap for the crystal, vary the oscillator plate tuning condenser C-4. A point will be found where the plate current decreases and then increases again. At the point of *minimum* plate current, the plate circuit is tuned to the second harmonic of the crystal frequency. Remove the meter plug from the oscillator cathode and insert it in the amplifier cathode jack (J-3) and *short* the telegraph key. Varying the amplifier plate condenser will also result in a dip in plate current at some setting. This indicates resonance with the oscillator. For the initial tuning of the amplifier, keep the neutralizing condensers at their minimum capacity setting. The antenna should be *disconnected* from the amplifier.

Neutralizing

We are now ready to neutralize the amplifier stage. The meter plug should be inserted in the amplifier grid jack (J-2) and the plate and screen voltages disconnected from the amplifier. The meter will then read rectified grid current, which is a measure of the amount of excitation to the amplifier. Rotating the amplifier condenser through resonance will, if the amplifier is not neutralized, result in a flicker of the grid current meter; in general the greater the flicker of current the further away from correct neutralization. When the stage is perfectly neutralized, there will be absolutely no flicker of the grid meter.

After the amplifier stage has been neutralized and tuned to resonance the *crystal oscillator* should be checked and adjusted for optimum output. With the meter in the amplifier grid jack and the key down, vary the cathode condenser slightly for maximum oscillator output, as indicated by a maximum reading of the grid current. It will be found that this condition will almost coincide with a small dip in the current flowing through the crystal, as indicated by the crystal pilot lamp bulb. The setting of the condenser for minimum crystal current is the desirable position.

If operation is desired on the *fundamental* frequency of the crystal, the cathode switch is set so that the entire cathode coil is shorted out. The oscillator then becomes a standard pentode oscillator; tuning the transmitter remains the same as when using the oscillator as a tri-tet, except that the oscillator cathode circuit is not used.

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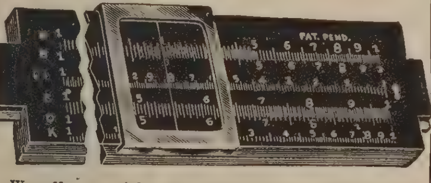

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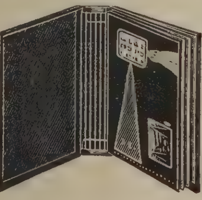

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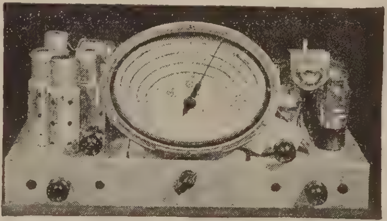

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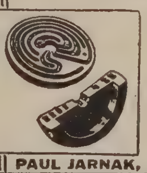

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WANTED: CIRCUIT DIAGRAMS, etc., for a RCA Radiola 20. Also interested in Radiola 20 parts, etc., and 1923-1928 volume of RCA Victor service notes. Fred Lurski, 15 Grove Terraee, Irvington, New Jersey.

OFFER 2½-5 METER, 4 TUBE transceiver, carbon mike, $20 R.C.A. record player, for exceptional camera or National SW3 with accessories, or superhet. Dick Gearhart, 920 School, Indiana, Penna.

WANTED: SMALL SHORTWAVE broadcast and transceivers for quantity of new radio parts and new tubes. Russell Spera, 35-37—34th St., Astoria, Long Island, New York.

HAVE ONE AND TWO TUBE radios, crystal sets, parts. Want rifles, radios, etc. John Haynes, Doe Run, Missouri.

WILL SWAP $112 N.R.I. COURSE specializing in communications complete with all extra booklets and experimental material for Sky Buddy, Super Clipper, or better communications receiver. Henry Greenawalt, Box 46, Mountville, Pa.

SWAP: VOLUME NO. 1, NO. 2 Official Radio Service Manuals, never used, value $8 for A.C. record player, 5-8 watt amplifier, Irwin 16MM camera, or 20 Hy. 300 Ma. 3000 V. filter choke. F. A. Smith, 1267 Logar Ave., Tyrone, Pa.

WANTED: GOOD TYPEWRITER in good condition. Will swap violin course practically new. Has not been used. Costs $36. Or what have you? Charles Rosich, 662 Jackson Ave., Bronx, N. Y.

WANTED CAMERA ALSO PHOTO equipment. Trade power packs, dynamic speakers, power transformers and Short Wave Crafts. Bernard Hines, 4012 W. 10th Avenue, Gary, Indiana.

HAVE RIDERS MANUAL NO. 3, 2 Official Radio Manuals and all other kinds of radio parts. Will trade for ohmmeter or tube tester. Abe Ochstein, 335 E. Lewis St., Fort Wayne, Ind.

WILL TRADE $139 "DE FOREST'S Training" radio course, practically complete, and 60 back issues Radio News, for good low power phone transmitter, 10 to 80 meters preferred. Clifford Jenkins, Clayton, New Mexico.

WANTED: SET ANALYZERS, meters, what have you. I have good 1/3 H.P. 110 V. A.C. motor. Also Majestic A and B eliminators, dynamic speakers, Majestic receiver (A.C.). Nelson A. Hitchcock, Williamstown, Pa.

I HAVE 15 COPIES READER'S Digest, 2 valuable volumes (completely illustrated with mannikins) "Medical Instructor for the People." 7 Canadian and Mexican coins. Want 16mm film or what? W9SZW, 3815 Congress Street, Chicago, Illinois.

160M CRYSTAL AND HOLDER, National i.f. transformer, Brownscope microscope, xmitting, rcvg parts, 350V transformer. I want antiques, antique jewelry or what? W9TMQ, 3860 Harrison Street, Chicago, Ill.

WANTED, 1 OR 2 EIMAC 50Ts, crystal mike, 40M. crystal above 3125 K.C., other trans. equipment. Have Emerson motor-generator, 6 boxes 12 gauge shotgun shells, other things to trade. H. Buehrle, 722 Penna., Gary, Ind.

WILL TRADE FOR STANDARD radio equipment a fine old violin. Perfect condition. Case included. Address letter stating cash offer or description of equipment to Post Office Box 651, Alfred, N. Y.

(Continued on following page)

World S-W Stations

(Continued from preceding page)

Mc.	Call	
6.625	PRADO	**RIOBAMBA, ECUADOR,** 45.28 m. Thurs. 9-11.45 pm.
6.610	YNLG	**MANAGUA, NICARAGUA.** 45.39 m. Emisora Ruben Dario. 1-3, 7-11 pm.
6.558	HI4D	**CIUDAD TRUJILLO, D. R.,** 45.74 m. Except Sun. 11.55 am.-1.40 pm.
6.550	XBC	**VERA CRUZ, MEX.,** 45.8 m. 8.15-9 am.
6.550	TIRCC	**SAN JOSE, COSTA RICA,** 45.8 m., Addr. Radioemisora Catolica Costarricense. Sun. 11 am.-2 pm., 6-7, 8-9 pm. Daily 12 n.-2 pm., 6-7 pm., Thurs. 6-11 pm.
6.545	YV6RB	**BOLIVAR, VENEZUELA,** 45.84 m., Addr. "Ecos de Orinoco." 6-10.30 pm.
6.520	YV4RB	**VALENCIA, VENEZUELA,** 45.98 m. 11 am.-2 pm., 5-10 pm.
6.516	YNIGG	**MANAGUA, NICARAGUA,** 46.02 m., Addr. "La Voz de los Lagos." 8-9 pm.
6.500	HIL	**CIUDAD TRUJILLO, D. R.,** 46.13 m. Addr. Apartado 623. 12.10-1.40 pm., 5.40-7.40 pm.
6.480	HIIL	**SANTIAGO DE LOS CABALLEROS, D. R.,** 46.28 m., Addr. Box 356. 9.40-11.40 am., 7.40-9.40 pm.
6.470	YNLAT	**GRANADA, NICARAGUA,** 46.36 m., Addr. Leonidas Tenoria, "La Voz del Mombacho." Irregular.
6.465	YV3RD	**BARQUISIMETO, VENEZUELA,** 46.37 m. Radio Barquisimeto, irregular.
6.450	HI4V	**SAN FRANCISCO DE MACORIS, D. R.,** 46.48 m. 11.40 am.-1.40 pm., 5.10-9.40 pm.
6.440	TGQA	**QUEZALTENANGO, GUATEMALA,** 46.56 m. Daily 6.10-10.10 pm., Sun. 1-3 pm.
6.340	HIIX	**CIUDAD TRUJILLO, D. R.,** 47.32 m. Sun. 7.40-10.40 am., daily 12.10-1.10 pm., Tues. and Fri. 8.10-10.10 pm.
6.335	OAXIA	**ICA, PERU,** 47.33 m., Addr. La Voz de Chiclayo, Casilla No. 9. 8-11 pm.
6.324	COCW	**HAVANA, CUBA,** 47.4 m., Addr. La Voz del Radio Philco, P. O. Box 130. 6.55 am.-12 m. Sun. 9.55 am.-10 pm.
6.310	HIZ	**CIUDAD TRUJILLO, D. R.,** 47.52 m. Daily except Sat. and Sun. 11.10 am.-2.25 pm., 5.10-8.40 pm. Sat. 5.10-11.10 pm. Sun. 11.40 am.-1.40 pm.
6.300	YV4RD	**MARACAY, VENEZUELA,** 47.62 m. 6.30-9.30 pm. exc. Sun.
6.295	OAX4G	**LIMA, PERU,** 47.63 m., Addr. Apartado 1242. Daily 7-10.30 pm.
6.280	HIG	**TRUJILLO CITY, D. R.,** 47.77 m. 7.10-9.40 am., 11.40 am.-2.10 pm., 3.40-9.40 pm.
6.270	YV5RP	**CARACAS, VENEZUELA,** 47.79 m., Addr. "La Voz de la Philco." Daily to 10.30 pm.
6.255	YV5RJ	**CARACAS, VENEZUELA,** 47.18 m.
6.243	HIN	**CIUDAD TRUJILLO, D. R.,** 48 m., Addr. "La Voz del Partido Dominicano." 12 n.-2 pm., 6-10 pm.
6.240	ZGE	**KUALA LUMPUR, FED. MALAY ST.,** 48.1 m. Addr. Malayan-Amateur Radio Society. Sun. Tues. and Fri. 6.40-8.40 am.
6.235	HRD	**LA CEIBA, HONDURAS,** 48.12 m., Addr. "La Voz de Atlantida." 8-11 pm.; Sat. 8 pm.-1 am.; Sun. 4-6 pm.
6.225	YVIRG	**VALERA, VENEZUELA,** 48.15 m. 6-9.30 pm.
6.210	——	**SAIGON, INDO-CHINA,** 48.28 m., Addr. Radio Boy-Landry, 17 Place A. Foray. 4.30 or 5.30-9.15 am.
6.205	YV5RI	**CORO, VENEZUELA,** 48.32 m., Addr. Roger Leyba, care A. Urbina y Cia. Irregular.
6.200	HI8Q	**CIUDAD TRUJILLO, D. R.,** 48.36 m. Irregular.
6.190	TG2	**GUATEMALA CITY, GUAT.,** 48.4. m., Addr. Dir. Genl. of Electr. Commun. Relays TGI Mon.-Fri. 6-11 pm., Sat. 6 pm.-1 am. Sun. 7-11 am., 3-8 pm.
6.185	HIIA	**SANTIAGO, D. R.,** 48.5 m., Addr. P. O. Box 423. 7 am.-5 pm.
6.156	YV5RD	**CARACAS, VENEZUELA,** 48.71 m. 11 am.-2 pm., 4-10.40 pm.
6.153	HI5N	**MOCA CITY, D. R.,** 48.75 m. 6.40-9.10 pm.

49 Met. Broadcast Band

Mc.	Call	
6.150	CJRO	**WINNIPEG, MAN., CANADA,** 48.78 m., Addr. (See 11.720 mc.) Daily 6 pm.-12 m., Sun. 5-10 pm.
6.150	ZPI4	**VILLARRICA, PARAGUAY,** 48.75 m. 5-6 pm.
6.147	ZRD	**DURBAN, SOUTH AFRICA,** 48.8 m., Addr. (See ZRK, 9.606 mc.) Daily exc. Sat. 11.45 pm.-12.50 am.; Daily exc. Sun. 3.30-7.30 am., 9 am.-3.45 pm.; Sun. 5.30-7, 9-11.30 am., 12 n.-3.20 pm. Also 4-5 am., 3rd Sun. of month.
6.147	ZEB	**BULAWAYO, RHODESIA, S. AFRICA,** 48.8 m. Mon., Wed., and Fri. 1.15-3.15 pm.; Tues. 11 am.-12 n.; Thurs. 10 am.-12 n. Sun. 3.30-5 am.
6.145	HJ4ABG	**MEDELLIN, COL.,** 48.79 m. 11 am.-12 n., 6-10.30 pm.
6.140	W8XK	**PITTSBURGH, PA.,** 48.83 m., Addr. Westinghouse Electric & Mfg. Co. Relays KDKA 11 pm.-12 m.
6.137	CR7AA	**LAURENCO MARQUES, PORT. E. AFRICA,** 48.87 m. Daily 12.05-1, 4.30-6.30, 9.30-11 am., 12.05-4 pm., Sun. 5-7 am., 10 am.-2 pm.
6.133	XEXA	**MEXICO CITY, MEX.,** 48.93 m., Addr. Dept of Education. Daily 8-11 am., 2.30-4 pm., 7.30 pm.-12.45 am. Sun. 1.30 pm.-12.45 am.
6.130	VP3BG	**GEORGETOWN, BRIT. GUIANA.** 48.94 m. From 5 pm. on.
6.130	TIEM	**SAN JOSE, COSTA RICA.** 48.94 m. "El Mundo", Apartado 1049. 11 am.-11 pm., Sun. 10 am.-6 pm.
6.130	CHNX	**HALIFAX, N. S., CAN.,** 48.94 m., Addr. P. O. Box 998. Mon.-Fri. 7 am.-11.15 pm., Sat. 11 am.-11 pm., Sun. 12 n.-11.15 pm. Relays CHNS.
6.130	LKL	**JELOY, NORWAY,** 48.94 m. 11 am.-6 pm.
6.125	CXA4	**MONTEVIDEO, URUGUAY,** 48.98 m., Addr. Radio Electrico de Montevideo , Mercedes 823. 10 am.-12 n., 2-8 pm.
6.122	HJ3ABX	**BOGOTA, COL.,** 49. m., Addr. La Voz de Col., Apartado 26-65. 12 n.-2 pm., 5.30-11 pm.; Sun. 6-11 pm.
6.122	HP5H	**PANAMA CITY, PAN.,** 49 m., Addr. Box 1045. 10 am.-1 pm., 5-11 pm.
6.120	W2XE	**NEW YORK CITY,** 49.02 m., Addr. Col. B'cast. System, 485 Madison Ave. 10.30-11.30 pm.
6.117	XEUZ	**MEXICO CITY, MEX.,** 49.03 m., Addr. 5 de Mayo 21. Relays XEFO 1-3 am.
6.115	OLR2C	**PRAGUE, CZECHOSLOVAKIA,** 49.05 m. (See 11.40 mc.)
6.110	GSL	**DAVENTRY, ENGLAND,** 49.1 m., 6.20-8.30, 9.20-11.20 pm.
6.110	XEGW	**MEXICO CITY, MEX.,** 49.1 m., Addr. La Voz de Aguila Azteca desde Mex., Apartado 8403. Relays XEJW 11 pm.-1 am.
6.110	VPB	**COLOMBO, CEYLON,** 49.1 m. Daily 7-9.30 am; Sun. 6.30-9.30 am.
6.108	HJ6ABB	**MANIZALES, COL.,** 49.14 m., Addr. P. O. Box 175. Mon.-Fri. 12.15-1 pm.; Tue. and Fri. 7.30-10 pm.; Sun. 2.30-5 pm.
6.100	YUA	**BELGRADE, JUGOSLAVIA,** 49.18 m. 12.45-2.30, 4-8 am., 1-6 pm.
6.100	W3XAL	**BOUND BROOK, N. J.,** 49.18 m., Addr. Natl. Broad. Co.
6.100	——	**NOUMEA, NEW CALEDONIA,** 49.18 m., Radio Noumea, Addr. Charles Gaveau, 44 Rue de l'Alma. 2-3.30 am., exc. Sun. and Mon.
6.097	ZRK	**KLIPHEUVEL, S. AFRICA,** 49.2 m., Addr. S. African Broad. Co., Johannesburg. Daily 12 n.-4 pm., Sun. 12 n.-3.20 pm.
6.097	ZRJ	**JOHANNESBURG, S. AFRICA,** 49.2 m. Addr. S. African Broad. Co. Daily exc. Sat. 11.45 pm.-12.50 am.; Daily exc. Sun. 3.15-7.30, 9-11.30 am. (Sat. 8.30-11.30 am.) Sun. 3.30-4.30 or 4-5 am., 5.30-7, 9-11.30 am.
6.095	JZH	**TOKYO, JAPAN,** 49.22 m., Addr. (See 11.800 mc., JZJ.) Irregular.
6.090	CRCX	**TORONTO, CAN.,** 49.26 m., Addr. Can. Broadcasting Corp. Daily 7.45 am.-5 pm., Sun. 10.30 am.-12 n.
6.090	ZBW2	**HONGKONG, CHINA,** 49.26 m., Addr. P. O. Box 200. Irregular.

(Continued on following page)

BARTER and EXCHANGE FREE ADS (continued)

HAVE STAMP COLLECTION cataloguing over $150.00, also many duplicates, Jiffyprint duplicating set, and many radio parts. Want radio parts or what have you? W2INO, 1140 College Ave., New York City.

6 TUBE BATTERY RADIO. AUDIO oscillator. 10,000 stamps. Want radio course, books, also parts and sets SW. A. Hartman, 5713—5th Ave., Brooklyn, N. Y.

WANTED FOR CASH OR TRADE: Portable radio set to work speaker, need not be in working condition, tubes and batteries not required. K. Voss, 666 Onderdonk Ave., Brooklyn, N. Y.

HAVE A GOOD VIOLIN WITH $7.50 bow, drawing outfit, radio parts. Want Sky Buddy or good S.W. receiver or transceiver. Eugene Tate, 316 W. College Ave., York, Pa.

SWAP: RADIO SET PARTS, electric hair clipper, battery charger, binoculars, used course in freehand drawing, valuable deer antlers, architectural compass for 120 bass piano accordion. All letters answered. C. Lauria, 67 Everett St., Everett, Mass.

HAVE ALL KINDS OF RADIO parts, short wave parts. Will exchange same for rifles or hunting equipment. Joseph Bakutis, 794 Quinnipiac Ave., New Haven, Conn.

WANTED LATE 8", 10" OR 12" records of all kinds not over two years old. Have radio parts and tubes to offer in trade. Paul Bahr, 1205 W. 10th St., Marion, Ind.

BOSCH AUTO RADIO LIKE NEW; Radiola 18; Speaker; new tubes; Kellogg Pwr Pk; guitar and case; Univex AF camera; 2—456 IF Trans; Wanted, good communications receiver. Ed. Prendergast, 736 Park Place, Long Beach, N. Y.

HAVE: PHILCO MODEL 90, Notre Dame water pump, Wurlitzer guitar, etc. Want Teleplex ham special, or? Joseph Kubik, 37 Pine St., Gt. Barrington, Mass.

SWAP—SAVAGE .22 SIX SHOT bolt action rifle. Weston 566-3 analyzer. RTL tube checker. Thomson 0-50 A.C. ammeter. Power supplies and many other parts. Want ham equipment. W1KSJ, 198 Boulcy Ave., Waterbury, Conn.

SWAP A DOUBLE BUTTON microphone and stand, have a Universal handi-mike good as new. Also a 5 meter receiver. Looking for ham short-wave receiver. W1LDD, 64 Zeigler St., Roxbury, Mass.

TRADE—EIGHT VARIABLE CONdensers from Atwater-Kent radios. "Kuprox" dry rectifier for what? Have Weston switchboard voltmeter 0-15-150 cost $48—for crystal and holder, any band, or? Albert Winniett, 237-27 Davenport Ave., Bellerose, L. I., N. Y.

HAVE 6 HORSE HEAVY DUTY inboard marine engine; also Johnson twin outboard and approx. 100 late radio magazines all different for power tools or radio equipment. H. Hohl, Jr., 609 E. Market, Sandusky, Ohio.

HAVE BOOKS. ELECTRIC SHAVer, movie camera and projector, field glasses, photo supplies, lots other items. What have you? Let's swap lists. M. Epstein, 2953 Ruckle St., Indianapolis, Ind.

TRADE EASTMAN KODAK "SPEcial" No. 620, Lens F:4.5, shutter 1 sec. to 1/400, with case, valued $47.25, like new, for camera with coupled range finder, will add cash difference. Vincent Cernis, 1515 S. 49th Court, Cicero, Illinois.

TRADE "MODERN RADIO HOOKups", "Principles of Radio Communications" by U. S. Army. "Application of Electricity to Transmission" (4 volumes) by Bell Telephone, for small set, trans. x'tal, anything. What say! Jim Redmond, 88-48 239 St., Bellerose, L. I., N. Y.

SWAP: CLASS B MODULATOR unit. Chassis 7" x 13", includes built-in screen voltage supply, Thordarson 11M75 multi-match output transformer, Thordarson 83D21 500 ohm line to grid input transformer, 2 Tung-Sol 616G. Write: W9TME, 2901 N. Kilbourn Avenue, Chicago, Ill.

HAVE ONE CYLINDER GAS ENgine in perfect running order also large variety of radio parts. Would like to get low power transmitter or SW receiver or what? A. Strusinskas, 6935 S. California Ave., Chicago, Ill.

STAMPS FROM ALL OVER THE globe, mint, used. Plenty of precancels, triangles, constitutions, etc. Issues from all continents. Will swap for receiver going up to 10 meters. J. Weiss, 547 E. 105 St., Cleveland, Ohio.

SWAP: COMMUNICATIONS superhet tunes 11-565 meters, ready for operation; allwave bandswitching superhet kit; radio parts, books, magazines, test equipment for portable typewriter. Stamp for swap-list. John J. Vilkas, 1515 South 49th Court, Cicero, Illinois.

EXCHANGE CODE MACHINE, tapes and key, crystal controlled C.W. transmitter complete. Ford auto radio, dynamic speakers, power and A.F. transformers, variable condensers, plug-in coils. Otis Pierce, % Box 1151, Alexandria, La.

WANTED: RADIO CATALOGUES for club rooms. Jackson Short Wave League, 616 Fourth St., Jackson, Mich.

DESIRE TO TRADE STAMP COLlection of 2000 varieties, hundreds unused, for good S.W. receiver as "RSR Clipper", "Doerle 5" or others. Michael Cooney, Box 237, Ft. Sam Houston P. O., San Antonio, Texas.

WANT ANY TYPE TEST EQUIPment. Will trade: 3-4 tube AC-DC battery s-w sets, radio parts, ¼ h.p. motor with drill press, ¼" chuck. Luigi D. Mingace, 89 Elm Street, West Newton, Mass.

SWAP: HRO SENIOR COMPLETE, perfect condition, for RME69, SX17 Hallicrafter, Super Pro. Must have noise silencer and broadcast. William Quigley, 102 Ave. S., Brooklyn, N. Y.

ALL STAR SUPERHETERODYNE short wave set, has beat oscillator, 12 inch dynamic speaker, 4 sets coils covering 10 to 144 meters. Trade for good film pack or Graflex camera. D. Pinegar, 8410 Dubay, Detroit, Mich.

WILL TRADE A BANJO-UKE for a good condition pocket radio. Banjo-uke is in good condition. Floyd Sossaman, Box 104, Colby, Wis.

SWAP JR. CANDLER CODE course good condition, also Candler speed hand course. Speed-X semi-automatic key or all kinds of radio parts for volt-ohm-milliammeter or Instructograph. S. Clark, 1119 Yale Ave., Cincinnati, Ohio.

HAVE RADIO AND ELECTRIC parts, Majestic service manuals, books, hand driven A.C. generator, stamps, electric experiment parts. Trade for a small transmitter. Sky Buddy or other radios preferred? What have you? Irvine Clifford, Linwood, Penna.

WILL TRADE NATIONAL INST. radio course and Chicago Tech. Builders course. Want high power transmitting equipment, superheterodyne must tune to 10-5 meters. J. T. Kelly, 778 W. 7 St., San Pedro, Calif.

SWAP 150 PAIRS HANDMADE wooden shoe charms, about 1 inch long, many sold at 25 cents pair. Want portable typewriter, Leica min. camera, woodcarvers tools, bicycle, or what have you? Otto Strand, 2854 East 197th St., New York City.

WANT USED CANDLER SYSTEM, complete and recent, for 852 by RCA, 5" PM dynamic speaker, or what do you need? Mangan, Box 218, North Warren, Penna.

WANT INDIAN POTTERY, relics, old guns, swords, daggers, deer head, old coins, statuary, vases, old prints, plants. Have banjo, Taxidermy courses, guitar, banjo-uke, fossils, minerals, Indian cents, plants, large list. Stanley Pytel, 5025 Ogden Ave., Cicero, Ill.

WANTED 3 OR 4 TUBE A.C. short wave receiver. Will pay cash to best offer. All letters answered. Lewis Molteni, 519 21st., Union City, New Jersey.

HAVE CRYSTAL MIKE TABLE stand, telephone mike, "19" tube, s.w. rec. using 24-27. Want 211, T20 or what have you? Frank Gazarek, 1124 W. 18th Pl., Chicago, Ill.

WANTED: U.S. COMMEMORAtives, collections, two tube A.C. short wave set. Trade: radio parts, tubes. Will exchange stamps, post cards with other collectors, especially foreign. Elmer Braswell, 1581 Melrose Dr., Atlanta, Ga.

HAVE CRYSTAL RADIO, 2000 ohm earphones, chassis parts (controls, tubes, coils), Antennatrol, wire, batteries, books, etc. Want good photo developing outfit. Murray Shainis, 99 Featherbed Lane, Bronx, New York.

WILL TRADE ARGUS CAMERA model AF and 35 mm. tank for Teleplex or Instructograph code machine and tapes. E. H. Jackson Jr., 932 15th Street, Augusta, Georgia.

SEVEN TUBE PHILCO MODEL 20 with poor tubes, two pairs of Union skates, 22 firearms. Want good make of bellow (plate) camera, lens 200-250 the second. John Nicholas, Rt. 1, Box 196, Miramonte Ave., Mountain View, California.

WILL TRADE HIGH SPEED electric drill, ¼" cap. for what have you. Also large number radio tubes. H. B. Ellis, 120 So. Cherry St., Richmond, Va.

WILL TRADE: HAMMARLUND dual 140 mmfd. condenser code MCD-140-M and lots other parts, for radio equipment. V. Babin, 1738 N. Newkirk St., Philadelphia, Penna.

EXCHANGE SET INTERNATIONal Correspondence School advertising books, full course in 6 volumes, for amateur radio equipment or code course. Describe fully. R. L. King, 308 West 18, Austin, Texas.

WILL SWAP SPRINGFIELD .22 rifle with peep sights for a good used portable typewriter. QR9, Everett Twining, 206 Quincy St., Springfield, Mass.

SWAP, NEW TUBES OR CASH for old automobile and motorcycle license plates from every state and country on earth. Trade radio set for old automobile. What say? Anthony Shupienus, Newport, N. J.

WANT GOOD SHORT WAVE converter with plug-in coils. Will pay cash. Carl V. Seibert, Jr., 77 Main Street, Oberlin, Pennsylvania.

TRADE 5 METER TRANSCEIVER complete, power supply, microphone, speaker and tubes (76,41), 30 watt 80 meter CW transmitter, also other parts; want short wave receiver. Send particulars. James Dolan, Box 655, Woonsocket, R. I.

WANT A CALL BOOK MAGAZINE not over a year old. Have tubes and other radio parts to trade. All letters answered. Paul E. Trued, Tribune, Kansas.

TRADE: 8 TUBE MILLER SUPERhet with 12" speaker, four switch bands, good construction and results; practically new, quality football equipment; also magazines, radio stuff, for what have you? Fred Gehricke, 2016 Palmetto Street, Brooklyn, N. Y.

HAVE NEW 16MM Moviematic camera, new electric razor, books, stamps, other items. Want all photographic items, enlarger, speedy candid camera, or? Michael Gianfrocco, 604 Union Ave., Prov., R. I.

TRADE RADIO PARTS FOR 2 button carbon mike and transformer. Electric pickup wanted. Have P.P. transformers and speakers, battery tube tester, Jewell 2 meter, Jefferson tube rejuvenator, etc. J. R. Reed, 2178 W. 3, Durango, Colo.

CLEANING OUT HUNDREDS OF radio parts. Also 5 tube s-w super. Send for list. Need Riders Manuals, typewriter, testing equipment, auto "A" eliminator, wrist watch parts, or? Stanley, 2748 Meade, Detroit, Michigan.

SWAP DEFOREST RADIO COURSE (complete 40 lessons) for typewriter, receiver, transceiver, 20 gauge shot gun, phono pickup, phono turntable or what? Will swap SWL cards 100%. Henry Botkin, Jr., 118 North Main St., St. Mary's, Ohio.

HAVE STAMP ALBUM, 1,000 different stamps, 3,000 assorted, Majestic super-dynamic speaker, Model G-2, set of coils 9½-550 meters, radio parts, magazines. Want S.W. receiver or? John Fitzpatrick, 18 First Street, Port Reading, New Jersey.

SWAP D.B. MIKE TRANS., ANTI-capacity switches, jacks, coil form 6 prong, 20 ma. relay, 3 in. mag. speaker, engineering, drawing, botany, chemistry, geology, college texts for QST's good condition. M. Byrne, 515 N. 15th, Boise, Idaho.

WANTED SHORT WAVE SET OR parts. Have stamp collection, 6,000 foreign and U.S. Also have most anything in the chemistry line. What do you want? James Starner, 141 Lewis Street, Phillipsburg, N. J.

WANT—RADIO BOOKS AND courses. Have stamp collections, mining and cartooning courses, camera, "Chandu" $2.50 magic outfit, also unused "Kick-Back" marble game. Wayne Beavers, R.F.D. 1, Forest City, Missouri.

WANT: CRYSTAL MIKE CLASS B for 4-46's. Have Shure (3A) D.B. mike, class A prime unit 30 watts for what have you in a class B (all A-1). Have many parts. Elmer Saxe, 1932 Faye Rd., Akron, Ohio.

TRADE—UMBRELLA TENT 7x9, folding steel camp bed, new radio parts for SW-3, Ultra-Stratosphere 10, or Sky-Buddy. Synchronous vibrator, power transformer for handset. L. T. Patterson, 32 H. Street, Salt Lake City, Utah.

BOOK-MATCH COLLECTORS-swappers. Do you have any from the flood city? How about a swap for some with your town and state on them? N. Griffith, 815 Highland, Johnstown, Penna.

WILL SWAP "RADIO READING COURSE" about fundamental radio, 100 formulas, book on making and using dry batteries. Books entitled "Toasts and Speeches" and "Business Letter Writer". Margaret Schleicher, 930 Hamilton Blvd., Peoria, Ill.

WANT PHONOGRAPH RECORDS (send list), U.S. precancels, and printing equipment (fonts of type, etc.). Have magazines, records, books, Underwood typewriter, stamps, radio stuff, etc. Walter McIntosh, Jr., 8 Summer Street, Melrose, Mass.

CANADIAN HAMS, ATTENTION. National SW5, Pwr., Spy., coils, spkr., R.T.A. radio course, Sprayberry's Mechanics of Radio, voltage tables, 1938 Candler Jr. Code course. Will trade for Hallicrafters rcvr. Top shape. Marsden, VE4AOZ, Milo, Alberta.

(Continued on following page)

BARTER and EXCHANGE FREE ADS (continued)

TRADE — MARVEL ELECTRIC shaver for what have you. F. Vieweger, 1411 S. 17th St., Manitowoc, Wis.

HAVE DAYRAD TUBE TESTER, 8 tube battery set and a Readrite model 710A analyzer. Want a good used RK20 and a 1250v. power-supply or what have you. Write. John Womack, Box 89, Dimmitt, Texas.

TRADE: AUTOMATIC CODE teacher, Keystone 16MM machine with film, set of Meissner short wave coils. Wanted: 40 meter crystal, transmitter parts, receiver, or what have you? John J. Rupert, RFD-4, Jackson, Ohio.

WILL SWAP "CHARLES ATLAS" dynamic tension health course, original cost $35.00. Want radio course, SW radio, typewriter or what have you? Robert Jones, 201 Walnut Street, Westernport, Md.

TRADE—MEISSNER IRON CORE i.f.'s, 456 kc., beat-freq. osc. trans., all new, Hinsdale socket set Chrome vanadium steel midget cost $8.00. Want mike, SW-3, test equipment or superhet. E. Decobert Jr., 609 Henrietta St., Gillespie, Ill.

50 SAXOPHONE LESSONS BY Virtuoso Music School, type 53 Sylvania radio tube and a 164 page book "Tricks with Coins". Will trade for what have you? Bill Schroeder, 803 Wisconsin, Peoria, Ill.

WILL SWAP LATE 1931 HUDSON De-Luxe sedan in A1 shape for good quality 2¼x2¼ reflex camera or what have you in photo supplies. David Snyder, 347 Georgia Ave., Brooklyn, New York.

TRADE POCKET SPORTSET 1 tube battery kit, made up of new Hammarlund parts, value $4.34 and pair Cannonball master headphones 3,000 ohms, for radio books or what have you? Alexander Podstepny, 217 Pine St., Phila., Penna.

WOULD LIKE TO TRADE stamps with any one. Have stamps from Panama, Costa Rica and Nicaragua (almost all recent issues). Want stamps from anywhere. Antonio Enriquez, Box 960, Balboa, Canal Zone.

WILL SWAP 6 TUBE PHILCO S.H. transitone auto radio, A-1 shape, with separate speaker, for photo enlarger, or what have you in photo apparatus? Jack Feibush, 79 Montgomery St., New York City.

SWAP SKIING EQUIPMENT, IMP. for recvr., parts, or? I swap SWL's. 100% QSL. Write! Justin Mueller, 1883 So. Blvd., Apt. 1C, Bronx, N. Y., U.S.A.

HAVE: HOME STUDY COURSE in electrical eng., Riders manual, also technical electrical books. Want good A.C. communications receiver. All inquiries answered. C. Tyls, 502 East 84 St., N. Y. C.

HAVE GOOD UNMOUNTED eighty meter crystal, frequency 3642.5 —Will swap for crystal having a frequency between 7000-7075, or 7190-7200, or 1960-1990 kilocycles. All inquiries answered. W4EFK, 1503 West Cass Street, Tampa, Fla.

WANTED: "LAFAYETTE Professional Nine" or similar superheterodyne receiver which covers from 10 to 160 meters. A.V.C. and B.F.O. preferred but not absolutely required. Describe results and price. Gordon Nordstrom, Hyland Station Rte. 7, Minneapolis, Minn.

WANTED 5 METER TRANSceiver must be complete with power supply. Send full info. M. (Marty) Greene, 68 East 3rd Street, New York City.

HAVE CHEMICALS AND APparatus for correspondence course in Mineralogy from U.C., Chemical Microscopy Handbooks by Chamot and Mason. Want Multimeter transformers, parts, etc. Herold Cordtz, Nevada City, Calif.

HAVE 5 TUBE A.C. SHORT WAVE set, Magnovox dynamic speakers, Baldwin head phones, Western Electric cradle phone, Weston meters, Webster phonograph pickup, swap list. Want camera or binoculars. M. Simon, Box 441, Gary, Indiana.

TRADE 18" ADJ. MAG. SPEAKer, field glasses, banjo-uke, 500 precancels, 300 postmarks, stamps, Baby Brownie camera, photographic equipment, two books, Auto Safety lighter, ACH sharp tuner dial, radio parts. R. Lewis, Griffithville, Ark.

WANTED NEW TUBES, RIDER manuals, test equipment, new radio parts. Have P. transformers transmission line, speakers, used tubes, power supply, Majestic model 90 A.B.C. What have you? Joseph Geviado, 159 Sabin St., Pawtucket, Rhode Island.

SWAP 16MM MOVIE PICTURE projector for 40 meter crystal and holder. Also swap SWL cards. Homer Evans, Jr., 205 West Main St., Portland, Ind.

WILL SWAP POSTAL CARDS and correspondence with distant radio fans. YL fans are welcome. Radio W8QHX, Glenn G. Godwin, 5 Mildred Ave., Binghamton, N. Y.

TRADE 250 WATT AND 210 tubes, high voltage variable condenser, Thordarson transmitting receiving transformers, filter chokes, power amplifier. Want Patterson preselector 852 tubes. C. D. Larimore, W9BBS, 408 East 11 St., North Platte, Nebr.

WANTED: USED PARTS FOR B eliminators, 1933-37 Radio Handbooks, late, used radio parts and SW radios, for cash. Will exchange circuit diagrams, QSL's, science magazines. Want small xmitter. H. G. McKay, Donalda, Alta.

TRADE: COOKES RADIO AND Auto Electrical courses, old tube collection, Atwater-Kent service manual, old 200, 201 VT1 tubes and other things. Want some U.S. stamp collections. R. W. Dieter, Box 109, R.2, Blue River, Wis.

TRADE WESTERN ELECTRIC carbon microphone for quartz crystal ground for somewhere between 3,500 KC and 3650 KC. Must be in good shape with holder. Write M. Wendell Schuster, 919 West 4th Street, Mt. Carmel, Ill.

HAVE DX-4 SHORT WAVE REceiver, Keystone movie projector, original cost $10, Westinghouse 1/50 h.p. motor, signal high frequency buzzer and 1 tube portable receiver. Want? Earl Carter, 12216 Taft Ave., Cleveland, Ohio.

HAVE GOOD SKY BUDDY, COMplete. Want ACSW3, transmitting parts, low power transmitter, or? Write L. C. Bohn, Bancroft 27, Exeter, N. H.

WANTED BACK ISSUES OF ALL radio magazines from 1936 to date. Have or can get anything you want. Jack E. Bannon, W8JXV, 412 Seneca St., Oil City, Penna.

I WILL EXCHANGE STAMPS of Australia and New Zealand for stamps of other countries, preferably British Colonies. Gibbons catalogue as basis of exchange if preferred. E. A. Clayton, Tinana, Maryborough, Queensland, Australia.

WANTED: 16MM MOVIE CAMERA insides, also 15MM wide angle lens, "A" mounting. Quote price, or will swap radio gear or 16MM films. Theodore Fisher, S/S Benjamin Brewster, Box 551, Baton Rouge, La.

TRADE 1-12 GAUGE REMINGton pump gun model 10, 2-B Eliminators, 1-Direct current generator 25 KW., 125V., 2 amp. Want: all wave signal generator, oscillator, service equipment, SW super receiver. John Franzel, 47 Bradford St., Auburn, New York.

WANTED TO BUY, A USED commercial receiver, such as Hallicrafter Skyrider, Challenger, National receiver, Sargent, etc. John Kotfis, 410 Valley Street, McDonald, Pa.

HAVE ONE 7 TUBE SUPER SKYrider, Model S-5 and one 2 tube 25 watt xmitter, and parts, for what have you. Call Bit. 6925 or Henry Wroblenski, 2601 N. Hoyne Ave., Chicago, Ill.

HAVE EASTMAN 3A FOLDING Kodak, guitar and case, marcelle irons and electric heater, Niagara School of Music piano course, National Geographics. Want short wave radio, manuals, service equipment, or what? C. Pollack, Chanute, Kans.

WANTED—PHONO. EQUIPMENT for P.A. work. State price, condition, etc. Ervin Hill, 1987 16th St., Akron, Ohio.

TRADE—NEW WESTINGHOUSE, 200 watt A.C. generator. Want crystal mike or 6L6 x'tal oscillator. H. O. Reid, 7313 Belinder Rd., KC., Mo.

WANTED: RIDERS MANUALS, No. 1, 2, 3, 4, 5, 6, 7, 8, 9. Will buy or swap speaker, sets, tubes, motors, anything electrical. Martin J. Kelly, 69 Valley St., Providence, R. I.

WANT SERVICING INSTRUMENTS, have 1934 five tube battery radio less cabinet, one tube radio and coils, telephone mike, used tubes, stamp collection, many other things in good condition. Ardell Rowe, 521 Stewart Ave., Grove City, Pa.

EXCHANGE: KEYSTONE MOTOR driven 16MM movie picture projector and 100 ft. of film, cost when new $18, for a good mike and record pickup. Gordon Smith, 8001 Bloomfield Ave., Montreal, Que.

EXCHANGE — DRIVER JIGSAW machine J505, including accessories, ¼ horsepower D.C. motor, used 4 or 5 times, for good camera or short wave set. J. Wiener, 884 Southern Boulevard, Bronx, N. Y.

NEW $4.41 UNIVERSAL SINGLE button mike for Bliley LD2 or Bliley B5 crystal between 7,000 kc/s and 7,175 kc/s. Exchange data first. Write: James C. Moulton, 4912 Quebec Street, N.W., Washington, D. C.

HAVE CAMERON'S "MOTION Picture Projection," recognized authority, latest edition, cost $5.00. Trade for Ghirardi's latest "Modern Radio Servicing," or what have you on servicing? E. W. Witte, Marion, S. Dakota.

SWAP RADIO PARTS, B-ELIMinator and radios for what have you. Roscoe B. Smith, Jr., 4409 W. 25 St., Little Rock, Ark.

WILL SWAP SEVERAL UNCUT smoky Arizona topazes for any thing radio, or what else am I offered? Would like copies of Broadcast News. Wayne Dickey, Wintersburg, Arizona.

HAVE HEAVY-DUTY RCA xfrmr 2-755v. 1¼ amp. wdgs. 1-450-0-450v. 100 mils wdg. Good for small xmttr. Will trade for wot have u? Paul Bahr, Marion, Ind.

WANTED PHOTOGRAPHIC equipment and old mechanical magazines. Have Zenith 6 tube auto radio and aerial all ready to install. John Sawyer, Tribune, Kans.

CORRESPONDENCE WANTED with all foreign countries. Will swap stamps and postcards. All letters answered. W. W. Hollister, Clear Lake, Iowa, U. S. A.

STAMPS. HUNDREDS OF U. S. first issue up. Papers 40 years old. Handmade leather articles. Want small shortwave radio. Or what have you. All letters answered. Roy Harding, Burlington, Kans.

TRADE FOR OSCILLOSCOPE, Units No. 1 and 3 completely wired with crystal, meters and tubes, ready to operate, Utah 80 watts transmitter, never used. L. B. Holtz, 553 Carroll St., Akron, Ohio.

CHEMICALS! OVER 100 DIFFERent kinds—in glass containers—experimental quantities. Will swap for S.W. receiver, a pair of phones and loudspeaker, or what have you? Harold Storch, 91 E. 208 St., N.Y.C., N. Y.

VIOLET RAY MACHINE, MIMEOgraph, books, stamps and articles to trade for useful items, U.S. stamps, electric drill, old auto radiator name plates. Mimeographed list for stamp. Rudolph Zak, 2509 East 89th, Cleveland, Ohio.

BUNDLE UP YOUR OLD OR new postcard views and send to me. For each one I'll forward one piece old Mexican money. (Not spendable now). No two cards alike please. Harold Maniss, Colorado, Texas.

WILL PRINT 1,000 SWL OR HAM cards to your individual design, in swap for 2 or 3 tube complete SW receiver in working order. Nite Owl Print Shack, 718 Allendale Street, Baltimore, Maryland.

WOULD LIKE TO HAVE LISTS of receiving and transmitting articles, which are for sale or exchange. Send your SWL card for my new red and silver one. Dean Cooper, 17 South 17th, Fort Dodge, Iowa.

I WOULD LIKE TO SWAP A National SW3 complete with 80 and 40 meter bandspread coils, also power supply, for No. 9 Riders Manual. Miss Rosemary Schmuch, 555 Carroll St., Akron, Ohio.

I WANT TO TRADE BOY MEchanic No. 4, 16mm movie film and late recordings of dance bands for whatever you have to trade. Melvin McCandless, 408 North Main St., Kirksville, Missouri.

WILL SWAP A PERFECT CONdition Winchester 44-40 caliber rifle with peep sight and gun case, value $35, for a good communication receiver. Harry W. Bell, 961 Van Duzer St., Stapleton, S.I., N. Y.

HAVE 2 YEARS' COPIES OF Ring Magazine, boxing and fiction books (history of all boxing champions). Will trade for model A Argus candid camera. Write for details on boxing books. Don E. Kailbourne, Genesee, Pa.

TRADE: ELEVEN TUBE 1937 table model Kadette radio. It has two bands and tone control. Want a Sky Champion or other band switching receiver. Must have 10 meters. Hue Diament, Perkiomen School, Pennsburg, Pa.

TRADE JENKINS TELEVISION receiver, less Televisor, 16mm Craig splicer and rewind, Kodascope 16mm Viewer. All letters answered. David Gross, 2145 Ocean Ave., Brooklyn, N. Y.

WANTED, USED SENIOR INstructograph in good condition with all or most tapes, and instruction book, preferably. Do not want oscillator equipment. Cash for best offer. All replies answered. Bob Palmer, 4832 Caroline, Houston, Texas.

HAVE WRIGHT & DITSON CONtender Tennis racquet. Cost $6.95. Used twice. Good condition. Trade for 3 tube A.C. SW set of like value. Must be ready to use. Teddy Witowski, 7 Stebbins St., Ludlow, Mass.

WANTED: MOTION PICTURE Cameras, projectors, films, etc., electric trains and equipment, model airplane motor, popular dance records. Have amplifiers, low powered transmitters, receivers, etc. Johnny Newsome, Box 725, Wake Forest, North Carolina.

World S-W Stations

(Continued from preceding page)

Mc.	Call	
6.083	VQ7LO	**NAIROBI, KENYA, AFRICA,** 49.31 m., Addr. Cable and Wireless, Ltd. Mon., Fri. 5.30-6 am., 11.15 am.-2.15 pm., also Tues. and Thurs. 8.15-9.15 am.; Sat. 11.15 am.-3.15 pm.; Sun. 10.45 am.-1.45 pm.
6.081	YV1RD	**MARACAIBO, VEN.,** 49.32 m. 6-11 pm.
6.080	W9XAA	**CHICAGO, ILL.,** 49.34 m., Addr. Chicago Fed. of Labor. Relays WCFL irregular.
6.079	DJM	**BERLIN, GERMANY,** 49.34 m., Addr., Broadcasting House. Irregular.
6.077	OAX4Z	**LIMA, PERU,** 49.35 m. Radio Nacional 7-11 pm.
6.075	VP3MR	**GEORGETOWN, BRI. GUIANA,** 49.35 m. Sun. 7.45-10.15 am.; Daily 4.45-8.45 pm.
6.070	HP3ABF	**BOGOTA, COL.,** 49.42 m., La Voz de Bogota.
6.070	CFRX	**TORONTO, CAN.,** 49.42 m. Relays CFRB 7.30 am.-12 m., Sun. 10 am.-12 m.
6.070	VE9CS	**VANCOUVER, B. C., CAN.,** 49.42 m. Sun. 1.45-9 pm., 10.30 pm.-1 am.; Tues. 6-7.30 pm., 11.30 pm.-1.30 am. Daily 6-7.30 pm.
6.069	——	**TANANARIVE, MADAGASCAR,** 49.42 m., Addr. (See 9.53 mc.) 12.30-12.45, 3.30-4.30, 10-11 am., Sun 2.30-4.30 am.
6.065	SBO	**MOTALA, SWEDEN,** 49.46 m. Relays Stockholm 1.30-5 pm.
6.060	—	**TANANARIVE, MADAGASCAR.** 49.5 m., 12.30-12.45, 3.30-4.30, 10-11 am.
6.060	W8XAL	**CINCINNATI, OHIO,** 49.5 m., Addr. Crosley Radio Corp. Relays WLW Tues., Fri., Sun. 5.45 am.-12 n., 11 pm.-2 am.; Wed. 5.45 am.-12 n., 9 pm.-2 am.; Mon., Thurs., Sat. 5.45 am.-2 am.
6.060	W3XAU	**PHILADELPHIA, PA.,** 49.5 m. Relays WCAU Tues., Fri., Sun. 12 n.-11 pm.; Wed. 12 n.-9 pm.
6.057	ZHJ	**PENANG, FED. MALAY STATES,** 49.51 m. 6.40-8.40 am., except Sun., also Sat. 11 pm.-1 am.
6.054	HJ6ABA	**PEREIRA, COL.,** 49.52 m. 9.30 am.-12 n., 6.30-10 pm.
6.050	GSA	**DAVENTRY, ENGLAND,** 49.59 m., 12.20-4, 4.15-6 pm.
6.050	HP5F	**COLON, PAN.,** 49.59 m., Addr. Carlton Hotel. Irregular.
6.045	XETW	**TAMPICO, MEXICO,** 49.6 m. Irregular 7-11 pm.
6.042	HJ1ABG	**BARRANQUILLA, COL.,** 49.65 m., Addr. Emisora Atlantico. 11 am.-11 pm.; Sun. 11 am.-8 pm.
6.040	W4XB	**MIAMI BEACH, FLA.,** 49.65 m. 1-3 pm., 9 pm.-12 m. Relays WIOD.
6.040	W1XAL	**BOSTON, MASS.,** 49.65 m., Addr. University Club. Irregular.
6.033	HP5B	**PANAMA CITY, PAN.,** 49.75 m., Addr. P. O. Box 910. 9.30 am.-1 pm., 5-10 pm.
6.030	VE9CA	**CALGARY, ALTA, CAN.,** 49.75 m. Thur. 9 am.-1 am.; Sun. 12 n.-12 m.
6.030	OLR2B	**PRAGUE, CZECHOSLOVAKIA,** 49.75 m. (See 11.875 mc.) Off the air at present.
6.023	XEUW	**VERA CRUZ, MEX.,** 49.82 m., Addr. Av. Independencia 98. 8 pm.-12.30 am.
6.020	DJC	**BERLIN, GERMANY,** 49.83 m., Addr. (See 6.079 mc.) 10.40 am.-4.30 pm.
6.017	HI3U	**SANTIAGO DE LOS CABALLEROS D. R.,** 49.85 m. 7.30-9 am., 12 n.-2 pm., 5-7 pm., 8-9.30 pm.; Sun. 12.30-2, 5-6 pm.
6.015	PRA8	**PERNAMBUCO, BRAZIL,** 49.84 m., Radio Club of Pernambuco, 6-9 pm.
6.012	ZHP	**SINGAPORE, MALAYA.** 49.89 m. 5.40-9.40 am., irregular.
6.010	OLR2A	**PRAGUE, CZECHOSLOVAKIA.** 49.92 m., Addr. (See OLR, 11.84 mc.) Off the air at present.
6.010	COCO	**HAVANA, CUBA,** 49.92 m., Addr. P. O. Box 98. Daily 7.55 am.-12 m., Sun. until 11 pm.
6.010	VK9MI	**S. S. KANIMBLA,** 49.92 m. (Travels between Australia and New Zealand). Sun., Wed., Thurs. 6.55-7.30 am.
6.010	CJCX	**SYDNEY, NOVA SCOTIA,** 49.92 m. Relays CJCB 7 am.-1 pm., 4-8 pm.

Mc.	Call	
6.007	ZRH	**ROBERTS HEIGHTS, S. AFRICA,** 49.94 m., Addr. (See ZRK, 9.606 mc.) Daily exc. Sun. 10 am.-3.30 pm.; Sun. 9 am.-12 n., 12.15-3.15 pm. Daily exc. Sat. 11.45 pm.-12.50 am.
6.007	ZRJ	**JOHANNESBURG, S. AFRICA.** 49.94 m., Addr. S. African Broadcast. Co., 3.30-4 pm. exc. Sun.
6.005	HP5K	**COLON, PAN.,** 49.96 m., Addr. Box 33, La Voz de la Victor. 7-9 am., 10.30 am.-1 pm., 5-11 pm.
6.005	CFCX	**MONTREAL, CAN.,** 49.96 m., Can. Marconi Co. Relays CFCF 6.45 am.-12 m.; Sun. 8 am.-10.15 pm.
6.005	VE9DN	**DRUMMONDVILLE, QUE., CAN.,** 49.96 m., Addr. Canadian Marconi Co.
6.004	RV59	**MOSCOW, U.S.S.R.,** 49.97 m. Irregular.
6.002	CXA2	**MONTEVIDEO, URUGUAY,** 49.98 m. Addr. Rio Negro 1631. Relays LS2, Radio Prieto, Buenos Aires. 10 am.-10 pm.
6.000	ZEA	**SALISBURY, RHODESIA, S. AFRICA,** 50 m. (See 6.147 mc., ZEB.) Also Sun. 3.30-5 am.
6.000	XEBT	**MEXICO CITY, MEX.,** 50 m., Addr. P. O. Box 79.44. 8 am.-1 am.

End of Broadcast Band

5.977	CS2WD	**LISBON, PORTUGAL,** 50.15 m., Addr. Rua Capelo 5. 3.30-6 pm.
5.975	OAX4P	**HUANCAYO, PERU,** 50.16 m. La Voz del Centro del Peru. 8 pm. on.
5.970	YV5RC	**CARACAS, VEN.,** 50.26 m., Addr. Radio Caracas. Sun. 7 am.-10 pm. Daily 7-8 am., 1-1.45 pm., 4-9.30 or 10 pm.
5.968	HVJ	**VATICAN CITY,** 50.27 m. Off the air at present.
5.950	HH2S	**PORT-AU-PRINCE, HAITI,** 50.37 m., Addr. P. O. Box A103. 7-9.45 pm.
5.935	YV1RL	**MARACAIBO, VEN.,** 50.52 m., Addr. Radio Popular, Jose A. Higuera M, P. O. Box 247. Daily 11.43 am.-1.43 pm., 5.13-10.13 pm.; Sun. 9.13 am.-3.13 pm.
5.913	YV4RP	**VALENCIA, VEN.,** 50.71 m. Irreg.
5.900	ZNB	**MAFEKING, BRI. BECHUANALAND S. AFRICA,** 50.84 m. Addr. The Govt. Engineer, P. O. Box 106. 6-7 am. 1-2.30 pm.
5.900	TILS	**SAN JOSE, COSTA RICA,** 50.85 m. 6-10 pm.
5.898	YV3RA	**BARQUISIMETO, VEN.,** 50.86 m., Addr. La Voz de Lara, 12 n.-1 pm., 6-10 pm.
5.885	HI9B	**SANTIAGO, D. R.,** 50.95 m. Irregular 6-11 pm.
5.875	HRN	**TEGUCIGALPA, HONDURAS,** 51.06 m. 1.15-2.16, 8.30-10 pm.; Sun. 3.30-5.30, 8.30-9.30 pm.
5.855	HI1J	**SAN PEDRO DE MACORIS, D. R.,** 51.25 m., Addr. Box 204. 12 n.-2 pm., 6.30-9 pm.
5.845	YV1RB	**MARACAIBO, VEN.,** 51.3 m., Addr. Apartado 214. 8.45-9.45 am., 11.15 am.-12.15 pm., 4.45-9.45 pm.; Sun. 11.45 am.-12.45 pm.
5.825	TIGPH	**SAN JOSE, COSTA RICA,** 51.5 m., Addr. Alma Tica, Apartado 800. 11 am.-1 pm., 6-10 pm. Relays TIX 9-10 pm.
5.813	TIGPH2	**SAN JOSE, COSTA RICA,** 51.59 m., Addr. Senor Gonzalo Pinto, H.
5.790	TGS	**GUATEMALA CITY, GUAT.,** 51.75 m. Casa Preidencial, Senor J. M. Caballeroz. Irregular.
5.758	YNOP	**MANAGUA, NICARAGUA,** 52.11 m. 8-9.30 pm.
5.740	YV2RA	**SAN CRISTOBAL, VENEZUELA,** 52.23 m., Addr. La Voz de Tachira. 11.30 am.-12 n., 5.30-9 pm., Sun. till 10 pm.
5.735	HC1PM	**QUITO, ECUADOR,** 52.28 m. Irregular 10 pm.-12 m.
5.145	OK1MPT	**PRAGUE, CZECHOSLOVAKIA,** 58.31 m., Addr. (See OLR, 11.84 mc.) Fri. 4.45-5.10 pm.: Sat. 5.15-5.40 pm.
5.145	PMY	**BANDOENG, JAVA,** 58.31 m. 5.30-11 am.
4.995	VUD2	**DELHI, INDIA,** 60.06 m., Addr. All India Radio. 7.30 am.-12.30 pm.
4.950	VUM2	**MADRAS, INDIA.** 60.61 m. Addr. All India Radio. 7 am.-12 n.
4.905	VUB2	**BOMBAY, INDIA,** 61.16 m. Addr. All India Radio, 7 am.-12.30 pm.

BARTER and EXCHANGE FREE ADS (continued)

TRADE TYPEWRITER FOR ARticles of value such as tools, card file, office supplies, pen and pencil set, kodak, etc. Frank Handshue, Seville, Ohio.

SWL EXCHANGE

SHORT WAVE LISTENERS IN all countries. Would like to exchange SWL cards with anyone anywhere. QRA—Art. Corminboeuf, 113 Parrot Place, Brooklyn, N. Y., U.S.A.

SHORT WAVE LISTENERS. SWL's I would like to swap crd's with U. S. and foreign countries. I QSL 100% hr. QRA—Arthur Woods, R.F.D. No. 1, Wellsburg, W. Va., U.S.A.

WOULD LIKE TO EXCHANGE SWL cards with any SWL in U.S. or foreign countries. All cards received here will be answered with our card. QRA John L. Ballin, 40 East 66 St., New York, N. Y.

I QSL 100%. SWL's in all parts of the world. I will exchange my card for yours. QRA—Jock Clements, 6800 Division Ave., Birmingham, Ala., U.S.A.

SHORT WAVE LISTENERS IN U.S.A. and foreign countries. Would like to exchange my SWL card for yours. Also swap "shack" photos. I QSL 100%. Edmund Brummer, 34-21. 89th Street, Jackson Heights, Long Island, New York, U.S.A.

YOUR SWL CARD WILL BE APpreciated. Answer all. Lewis Neuman, Box 8363, Pittsburgh, (18) Penna.

SWL'S WILL SEND MY CARD for one of yours. I QSL 100%. U.S.A. or foreign countries. F. E. Massey, 58, St. Annes Road, Cornmeadow, Worcester, England.

WOULD LIKE TO SWAP SWL cards with SWL's and Hams all over the world, but mainly in foreign countries. What say old Bug? F. A. Moore, 109 W. Granville Rd., Worthington, Ohio, U.S.A.

WANT TO SWAP QSL CARDS with YL amateur radio ops. Will QSL 100%. W9SEF, Harold Lantow, Renwick, Iowa.

ATTENTION! SWL'S OR PICture postcard collectors. Will swap my SWL card or picture postcard or both for one or both of yours. I will reply promptly. George Mills, 13, Critchley Street, Ilkeston, Derbyshire, England.

I WILL EXCHANGE SWL CARDS with any person American or foreign. What say gang K? Fred White, 34 Gould Street, Wakefield, Mass., U.S.A.

POSTCARD VIEWS. SWL CARDS wanted at this SWL post from all countries. Will correspond with SWL's Africa, Asia. All letters, cards answered 100%. QRA—VE3SWL, Meredith M. Stroh, 172 Queen St., N., Kitchener, Ontario, Canada.

SHORT WAVE LISTENERS IN U.S.A. and foreign countries. Would like to exchange my SWL card for yours. Louie Kucera, P.O. Box 102, Apache, Oklahoma.

AUSTRALIAN SWL WOULD LIKE to exchange cards with U.S.A. and foreign listeners. 100 percent QSL from here! How about it, chaps? QRA—Albert E. Kent, "Cranbury," Stoney Creek Road, Hurstville, N.S.W., Australia.

SWL'S AND HAMS ALL OVER the world. Let's swap cards. I QSL 100%. QRA—Joe Berly, Jr., 107 N. Clemson Ave., Clemson, S. Carolina.

SHORT WAVE LISTENERS IN all countries. I would like to swap SWL cards with anyone anywhere. QRA—Jack DeMay, 655—90 St., Brooklyn, N. Y., U.S.A.

SHORT WAVE LISTENERS AND hams in U.S.A. and foreign countries. Like to send one of my SWL cards in exchange for yours. Fred W. Goods, 2437 Shattuck Ave., Berkeley, Calif., U.S.A.

ATTENTION SWL'S ALL OVER the world. I will swap cards 100% with everyone. Let's be the best of friends. QRA—H. B. Emmett, 1639—Sixth Street, Portsmouth, Ohio.

SWAP SWL OR POSTCARDS with everyone, everywhere. Maylan Wilbur, Weld, Maine.

Let's Listen In with Joe Miller

(*Continued from page* 489)

JAPAN—Mr. Gallagher reports this news from West Coast.

JZZ, 17.78 mc., with a special broadcast 8-8:30 a.m., requesting reports.

JVH, 14.60 mc., broadcasting program Suns.—12:30-1 a.m., often till 1:15 a.m.

JVL, 11.66 mc., phoning 1 a.m., also JVA, 18.91 mc.

INDIA—On West Coast, Delhi on 4.99 mc. Call VUD2, is heard stronger than on 9.59 mc., this on the morning schedule. Roy Myers and Ashley Walcott report the 4.99 mc. freq. Morning schedule is 6:30 a.m. on.

TURKEY—TAO, 15.195 mc., at Ankara, is reported heard, with a schedule of 1:20-5 p.m. This station is believed to relay 2RO4 quite often, as the Italian station's programs are often heard through TAO. This new and as yet unconfirmed station is also reported on 9.465 mc., daily from 6:30-7 a.m., but we believe this to be on only irregularly.

EGYPT—SUZ, 13.82 mc., Cairo, heard at 12:45 p.m., using inverted speech. SUZ is very often heard at 11 a.m. in schedule with GBB, 13.585 mc., Rugby.

MOROCCO—CNR, 12.83 mc., at Rabat, was logged once at 2:45 a.m., with a woman heard phoning in side band secrecy. CNR usually heard in early afternoons.

DUTCH BORNEO—YCP, 9.12 mc., at Balikpapan, heard almost daily, contacting a new Javanese phone on 10.055 mc., at 4:30 a.m., by N. G. Stahevitch, W6. Both were heard R8-9. Clear speech transmission used only. Here's your chance to "log" a rare new country in Dutch Borneo! All Javanese phones are QSL'd through the Javanese phone QRA (address) in Bandoeng.

MOZAMBIQUE—CR7BH, 11.718 mc., heard weakly of late, during afternoon schedule, 3-4 p.m., by Jack Buitekant, W2. Mr. Stahevitch reports CR7BH at 10-11 a.m. on West Coast, R7.

HAM STARDUST

The *amateur bands* have shown renewed activity with the advent of cooler weather, and from now on, there'll be plenty o' DX for all.

Ten meters has opened up nicely, and numerous South African phones are being logged at up to R9. This "FB" reception should continue right through to February, though, of course, 10 is more subject to variations in conditions than 20 m., the ol' reliable DX band. Best times for 10 on East Coast is from 11 a.m.-1:30 p.m., when Europeans, and later South Africans, are well heard.

Also reported are occasional ZL's and VK's, these heard in early evenings from 6-8 p.m., but very irregular, here on East Coast.

Twenty meters is rather quiet now, but South Africans should begin to evidence themselves soon after this article appears, on East Coast, from 11 p.m.-1 a.m.

Very few Asiatics are now heard in East in mornings on 20, the West Coasters enjoying more or less exclusive reception of the PK's, VS's, etc.

Here goes:

ASIA

VU2CQ, 14270 kilocycles, India, reported by Roy Myers.

KA1JM, 14300, the yacht "Jen," in Manila Harbor, P.O. Box 817, Manila, Philippines, is a new one heard by Ashley Walcott. Also KA3KK, 14320, Boguio, which is operated by the w.k. KA's, 1YL, and 1ZL. Roy Myers also reports KA3KK.

VS3AF, 14350, in Jahore, Non-Fed. Malay States, is a nice DX catch for Mr. Walcott. Congrats, OB.

VS6AG, Hong Kong, is a "regular" on 14080.

FI8AC, French Indo-China, our ol' friend Rene, is often heard on 14070.

From Burma, XZ2DY, 14100, has the best "sig," sez Ashley, who reports other DX above. Others, much weaker, are XZ2EX, 14340, and XZ2PB, 14040.

PK1GL, 14270, PK1VY, 14270, and PK2RN, 14320, are reported 7-8 a.m. by Gail Beyer, W9. FB, OM!

Ralph Gozen reports a veri of PK1VY.

We recently received a veri, somewhat late, from PK6WF, who is OM Federoff, conducting a geological expedition into the wilds of Dutch New Guinea and Papua. Believe it or not, OM Federoff sent us the QSL, together with a dozen "FB" photos of native scenes, very interesting, too, all by *air mail* from Dobo, New Guinea!! Talk about being obliging, whew! Wish we could enlarge on this interesting letter here. Tanx a million, OM!

J6DU, 14180, J5CC, 14405, J2MI, 14080, and J2CR,. 14035, all reported by Jim Doyle, W9. Vy FB, OB! Ralph Gozen also reports J5CC.

From South Africa, the following are reported on 20 meters:

ZS1AX, 14080; ZS1BL, 14360; ZS1CN, 14070 and 14290; ZS1B, 14060; ZS2AZ, 14120; ZS2AH, 14020; ZS2BB, 14050; ZS2N, 14030; ZS4H, 14270; ZS5AW, 14090; ZS5AD, 14100; ZS5BZ, 14030; ZS5BH, 14400; ZS5BS, 14140, 6 watts; ZS5T, 14050; ZS6AJ, 14130; ZS6BA, 14350; ZS6DJ, 14040; ZS6AD, 14080; ZS6DM, 14090 and 14300; ZS6DW, 14040 and 14070; ZS6W, 14030 and 14370; ZS6EF, 14370; ZS6EY, 14080; ZS6ED, 14040; ZS6FB, 14140.

ZE1JX in Southern Rhodesia on 14020.

All above reported by Roy Myers, Ashley Walcott and N. G. Stahevitch, all W6.

VQ2HC, 14310, heard by Roy Myers, from Northern Rhodesia. Mr. Stahevitch also reports this catch.

ZL2JQ, 14050, reported by Gail Beyer.

ZL2BE, New Zealand, on 14210, heard at 7:10 a.m. by Roger Legge, W2.

A nice one on 20 is CN1AF, 14280, heard nearly daily 5-7 p.m. Many report him. Located at Tangier, International Zone. QRL is Jose M. Sierra, 19 Rue Sources, Tangiers, International Zone. CN1AF QSL's promptly.

ZB1L, 14130, Malta, reported by Gail Beyer.

On 10 meters, we've heard a few So. Africans in the brief time we've tried this band on Suns.

ZE1JR, ZE1JN, ZS1AX, ZS5CL, ZS6S, ZS6A, ZS6EG, ZS6DY, ZS4H are all we've heard.

Roger Legge reports ZL3BV at 7 p.m., also ZL2BT. Also SU1RO, at 9:30 a.m., all on 10. FB, Roger!

A tip: VR6AY doesn't want reply coupons, as they cannot be redeemed. Send U. S. stamps or New Zealand stamps.

Let's hear from all you OM's next month. All our vy 73s to you, OB's, es lots es *lots* o' DX to ye!

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441 Line Television Receiver

(*Continued from page* 479)

horizontal position with the reflector placed one-quarter wave length behind the antenna proper.

The transmission line from the antenna to the receiver is connected to the matching stub (preferably by clips), so that it can be adjusted for maximum signal strength.

Parts List—R.F., Det. and Video Sections

RAYTHEON (Tubes)
5—1851 tubes
1—6H6G tube

HAMMARLUND
4—HF-50 mmf. variable condensers
3—2.5 mh. R.F. chokes
6—8-prong sockets

AEROVOX (Condensers)
13—.01 mf. 500 V. fixed, mica
1—.001 mf. 500 V. fixed, mica
4—.005 mf. 500 V. fixed, mica
2—.0001 mf. 500 V. fixed, mica
1—.1 mf. 600 V. fixed, paper
1—.25 mf. 600 V. fixed, paper
2—2. mf. 400 V. fixed, paper
4—8. mf. electrolytic

I.R.C. (Fixed Resistors)
1—150 ohms BT (all ½ watt)
3—175 ohms BW
4—1500 ohms BT
4—2000 ohms BT
4—5000 ohms BT
5—60,000 ohms BT
3—250,000 ohms BT

CLAROSTAT
1—1500 ohm potentiometer

MISCELLANEOUS
Shielding material (copper, brass or aluminum)
12—½" stand-off insulators
Assorted screws

Radio Helped Make Movie

(*Continued from page* 464)

tor and an 802 final with 42 speech and 6A6 Class B modulator using a single-button mike. The genemotor is built in for the plate supply and is equipped for relay action for break-ins. It has plug-in coils and carries two crystals which makes it possible to switch from one frequency to another without loss of time and because of the Collins network is enabled to work on all frequencies, regardless of length of antenna. It is completely controlled by the switch on the hand "mike" and its total weight is 30 lbs. in a 20 x 10 x 10 inch case. It uses an ordinary storage "A" battery for its power.

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Answers to QUIZ on page 467

1. b—All others are resistors
2. c
3. c & e
4. aE, bD, cB, dG, eC, eA, fF, gH, hG
5. a—e is also a general term
6. d
7. a
8. e
9. a
10. c
11. b & c
12. b & d
13. aC, bF, cA, dE, eB, fD
14. a, 1.434; b, 1.5; c, 1.2; d, 2.
15. b
16. d
17. b
18. c
19. a & d
20. b
21. a, mega; b, micro; c, milli; d, micromicro; e, meters; f, milli.
22. c
23. f
24. c
25. b (& sometimes c)

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of Radio & Television, published monthly at Springfield, Mass., for October 1, 1938.

State of New York }
County of New York } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Hugo Gernsback, who, having been duly sworn according to law, deposes and says that he is the editor of the Radio & Television, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Popular Book Corporation, 99 Hudson Street, New York City; Editor, Hugo Gernsback, 99 Hudson Street, New York City; Managing Editor, H. Winfield Secor, 99 Hudson Street, New York City; Business Managers, none.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member must be given.) Popular Book Corporation, 99 Hudson Street, New York City; D. Gernsback, 99 Hudson Street, New York City; H. Winfield Secor, 99 Hudson Street, New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state). None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is .... (This information is required from daily publications only.)

(Signature of publisher)
H. GERNSBACK.

Sworn to and subscribed before me this 29th day of Sept. 1938.

MAURICE COYNE.
(My commission expires March 30, 1940.)
New York County Clerk No. 562.

Interesting articles to be found in the current issue of

Radio-Craft

TUBES: New Tubes for 1939. Read about the 22 new tubes and 8 ballasts just introduced.

SERVICING: Making a Service Man's Test Unit — The Super-Geno-Scope — Part 1. A compact instrument for faster servicing.

SHORT WAVES: Traffic Lights in Your Car—by Radio! A new avenue of business for the Serviceman; helps speed traffic and reduce hazards.

SOUND: Play Talkies Through Your Radio Receiver.

TEST EQUIPMENT: Experiments with Multibrators—Charles Sicuranza.

—December issue on all newsstands November 1.

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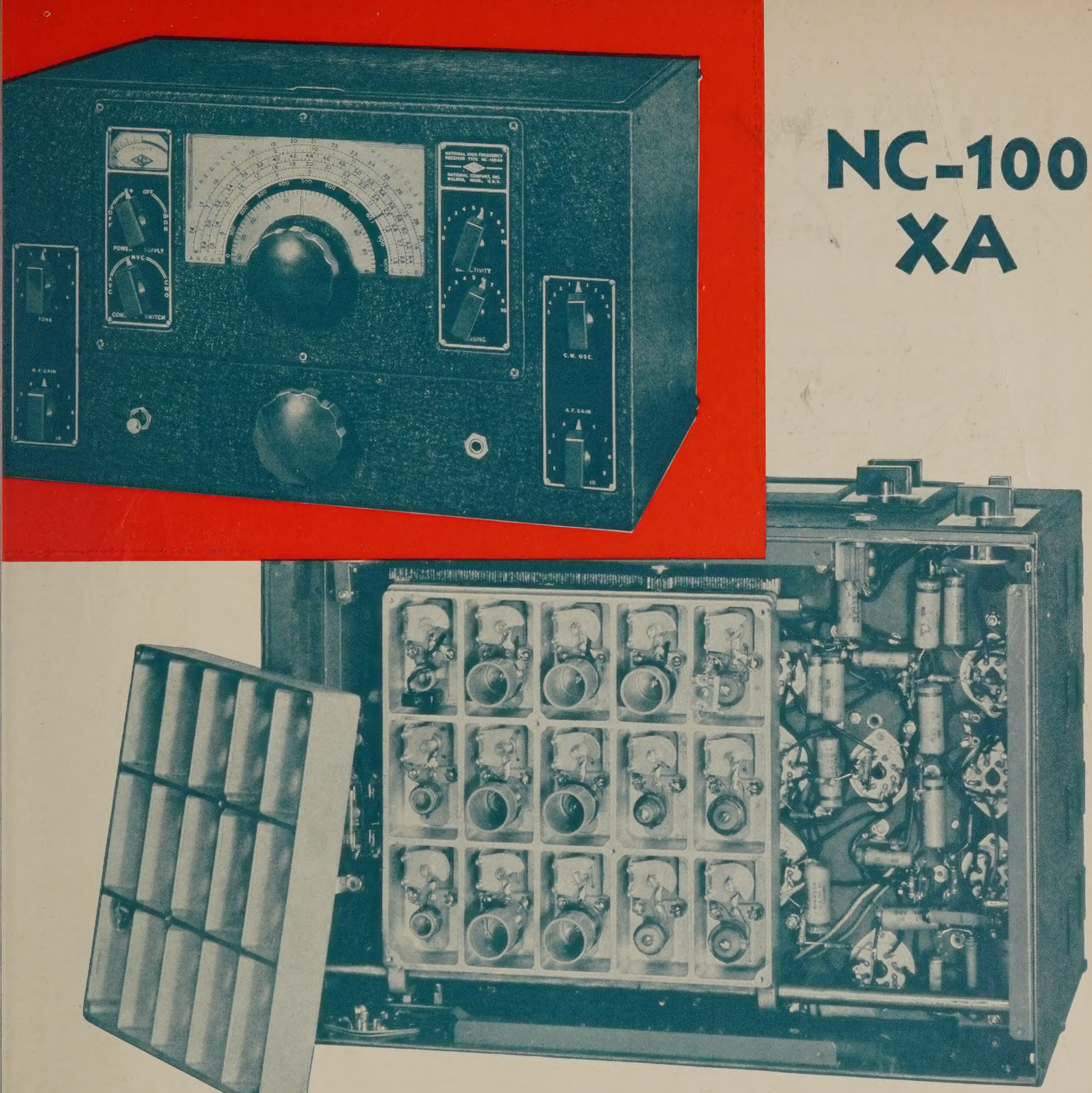
NC-100
XA



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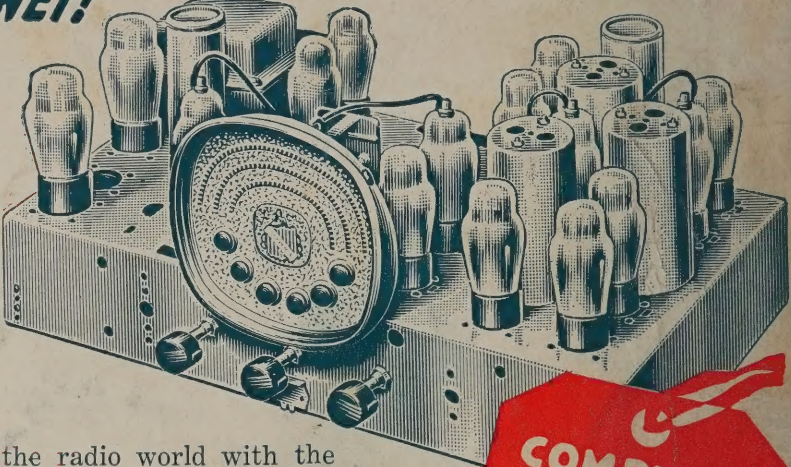

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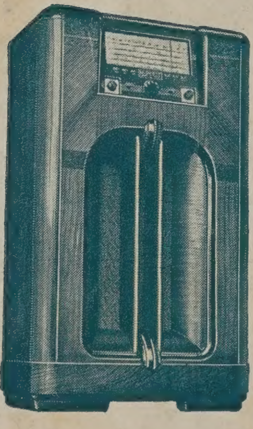

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